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OPTIC ATROPHY IN HONG KONG PRISONERS OF WAR*

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OPTIC atrophy from malnutrition is a rare disease in civilized man. On occasions it has been reported as occurring in the native population of Asia and Africa and very rarely in people of Southern Europe and Southern United States. The recent war has produced for the first time in white people a considerable number of cases of optic atrophy in the prisoners of war taken by the Japanese.

This report will deal with the present eye condition of 560 members of the Winnipeg Grenadiers who returned to this district after nearly 4 years of captivity in Hong Kong and the Japanese Islands. The Department of Ophthalmology, Deer Lodge Hospital, Department of Veterans' Affairs has examined a total of 375 of these men, 95 of whom showed partial optic atrophy. Because the clinic's facilities are freely available we feel we have seen all moderate and severely affected cases. A partial review of the remaining files indicates that there are probably 15 or 20 men with very slight partial optic atrophy (vision 20/30 or better) who did not avail themselves of the eye examination which was advised. Thus, we feel confident there were about 115 cases of partial optic atrophy in the returning force of 560 men, a total incidence of about 20%.

CONDITIONS IN PRISON CAMP AND DIET

Following a thorough medical examination the Grenadiers left Winnipeg in October, 1941, to join the Forces in Hong Kong and were judged to be in good physical condition. On December 25, 1941, after a hopeless struggle lasting about 14 days these troops were taken prisoner by the Japanese. Few felt that they would be alive for long. Coupled with this nervous strain and uncertainty as to the future was the immediate lack of food. Lieut.-Col. J. N. Crawford and Major J. A. G. Reid, medical officers with the force, have written an excellent report on the period of imprisonment.[1] They say that the food value per man dropped from army scale of rations to 1,700 to 2,300 calories per day, but that much of this food was spoiled and could not be eaten. It is probably safe to say, as they do, that the actual caloric intake during some periods ran as low as 1,200 to 1,500 calories per day per man. Dysentery and malnutrition diarrhœa further reduced the effective nutritive value of this amount. In the first few months the average weight loss per man was about 35 to 40 pounds.

The diet was composed largely of polished rice, with occasional supplies of half rotten fish or meat, soya beans, a little flour and sugar, and a fair quantity of mixed vegetables. Water was freely available. Food trading with guards and the black market was negligible, and Red Cross parcels did not arrive during the first year, *i.e.*, until October, 1942. In short, this diet was particularly low in proteins, fats and vitamins. The only available greens was a particularly vile tasting fibrous weed, and even this was eaten in limited amounts on the advice of the medical officers.

On this diet deficiency diseases began to develop in the men by about April, 1942. At this time work parties were organized to do manual labour on a nearby aerodrome. By July, 1942, every man who was able to walk was forced into heavy labour, working in the heat and glare of the sun. If a man was unable to work his already meagre ration was decreased.

ONSET OF EYE CONDITION

In Lieut.-Col. Crawford's[1] report it is stated that there were 2 periods during captivity when the diet was reduced to the 1,800 calorie level, namely summer and fall of 1942 and

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again during 1944. Also, it is stated that during captivity 60% of the men experienced a decrease in visual acuity at some time or another. We now find only 20% or a third of these with residual optic atrophy.

In June, 1942, the supply of rice fell very low; this was the main food intake. An old disused rice warehouse stood in the vicinity. The floors and cracks of this were swept clean and the rice salvaged. This rice was of poor quality, old and mouldy, containing bits of glass and many unknown contaminating factors. It was only a matter of a few weeks following this when blurred vision commenced. Ninety per cent of our cases occurred during the latter half of 1942, reaching a peak in September and October.

During this period most of the camp suffered varying degrees of beriberi (wet and dry), pellagra, "hot feet", and leg sores. These conditions did show some improvement on the very limited supply of thiamine, nicotinic acid and shark oil available. However, on this treatment the blurring of vision showed very little change. In many cases the visual acuity improved gradually over the next few months. The greatest recovery of sight occurred when the caloric value of the diet improved early in 1943. Of our severe cases, however, 50% state that their vision has shown little improvement since 1942. In most cases the onset was gradual over a period of 3 to 4 weeks, but in a few occurred in as short a time as 24 to 48 hours.

Besides beriberi and pellagra which were present to a degree in most of the men, many also suffered from dysentery, malaria, jaundice and diphtheria. An epidemic of the latter struck the camp in October, 1942. However, the concurrence of one or a combination of these conditions did not appear to be essential for the onset of failing vision. Thus several of our cases say they were feeling fairly well at the time they noticed vision blurring. One nursing orderly whose vision was 20/100 O.D., 20/80 O.S., working in the hospital, states that he was taking injections of the limited supply of thiamine, plus "vitamin wafers" at this time to ward off beriberi and pellagra symptoms. Despite this he noticed during the same period that his vision was becoming gradually more blurred and it remains so now. The opposite picture is seen in W.M., aged 34, who during 1941 in Jamaica had dengue fever, malaria and V.D.G. As a prisoner in Hong Kong, he had beriberi, pellagra, dysentery, diphtheria, pneumonia and a further attack of malaria. Despite all these infections this man's vision is normal. Lieut.-Col. Crawford states that the limited vitamin therapy would improve the beriberi neuritis, but seemed to have little effect on the eye complaint. This is confirmed by Goldsmith[2] working with natives in Africa, who reports that a regimen of proteins, such as eggs or meat, resulted in improvement of vision.

NATURE OF THE EYE CONDITION

It will be seen from the foregoing that the cause is obscure and probably multiple, *e.g.*, nervous strain, hypoproteinæmia, hypolipæmia, avitaminosis B complex, toxic factor in mouldy rice plus a basic congenitally vulnerable optic nerve. Hobbs and Forbes,[3] writing on Australian cases seen at the time of onset of defective vision in Asia, say that the only funduscopic finding was a slight hyperæmia of the disc in a few cases. On rare occasions minute hæmorrhages were seen.

Our cases on the whole resemble the late results of a toxic amblyopia of tobacco or severe bilateral retrobulbar neuritis. They are an optic nerve atrophy affecting mainly the maculo-papillary bundle. This results in a small, dense, centro-cæcal scotoma causing loss in visual acuity and slight, if any, peripheral field changes. Objectively, the only finding has been pallor of the temporal quadrant (macular area) of the optic disc. The degree of pallor has been a most unreliable sign of nerve damage, except in the most severe cases.

Adamson,[4] reporting on the general condition of these men, states their main symptoms were excessive perspiration, paræsthesiæ of legs, morning anorexia and general fatigue. Partial optic atrophy has been the commonest permanent neurological defect. As one objective test of the extent of the peripheral neuritis resulting from the malnutrition he has chosen the absence of the knee jerk. This sign was elicited in 60 (20%) of 300 men examined. Of these only 25 showed any optic atrophy. It would appear therefore that there is no definite connection between the residual peripheral neuritis and the optic neuritis.

In short, the original condition suggests a retrobulbar neuritis resulting in optic atrophy. Rich[5] has suggested the term "neuropathy". Ridley[6] in Rangoon reporting 100 cases, and

Dansey-Browning[7] in England reporting 30 cases, found results which seem to correspond with our group.

VISUAL FINDINGS IN THIS STUDY

These men have been seen over a period extending from October, 1945, to August, 1946, *i.e.*, 3 to 3½ years following the onset of the retrobulbar neuritis or neuropathy. About 50 cases have been reviewed during October and November, 1946, and no change in vision has been found. Only 10 to 15 cases felt that their vision did improve materially following liberation and proper diet. We therefore feel that the eye condition of these men has reached a fairly permanent state.

On careful ophthalmic examination there was little to see beyond pallor of the temporal quadrant of the disc. It was remarkable how little could be judged from the degree of disc pallor. Thus, many men with moderately pale discs had normal vision and some with normal discs proved to have only 20/200 vision. There was no constant relationship between the degree of disc pallor and the loss of visual acuity. Some degree of pallor was the rule in the worst cases.

The other ocular findings were loss of visual acuity and visual field changes.

Visual acuity.—Each man was refracted and corrective glasses supplied if these improved vision. Table I shows the results of corrected vision.

Fifteen per cent of the 95 cases showed some difference in the degree each eye was affected, for example, O.D. 20/40; O.S. 20/100; or O.D. 20/40; O.S. 20/20. This difference was never more than 3 or 4 lines on the visual acuity chart. In the remainder of the cases both eyes suffered about equally. It wil be seen that 23 of the 95 men had binocular vision of 20/200 or worse, *i.e.*, economically blind. Our worst case was O.D. 20/1,000, O.S. 20/800. This is not as bad as it would appear, as all these men had fairly normal peripheral fields of vision although their macular vision was destroyed. Reading and fine work presented their greatest difficulty. One man of this blind category actually is driving his own car and his wife acts as his only constant passenger.

TABLE I.
VISUAL ACUITY IN 95 CASES OF PARTIAL OPTIC ATROPHY FROM MALNUTRITION

Vision	*Number of cases vision in better eye*	*Number of cases vision in worse eye*	*Number of affected eyes and their vision*
20/1000-20/200	12	14*	26
20/200	11	13	26
20/100	4	9	13
20/80	10	8	17
20/60	7	10	15
20/40	11	18	28
20/30	14	12	24
20/25	15	11	25
20/20	11	0	(fields) 3
Total.....	95	95	177

* One case, O.D. enucleated due to progressive corneal infection.

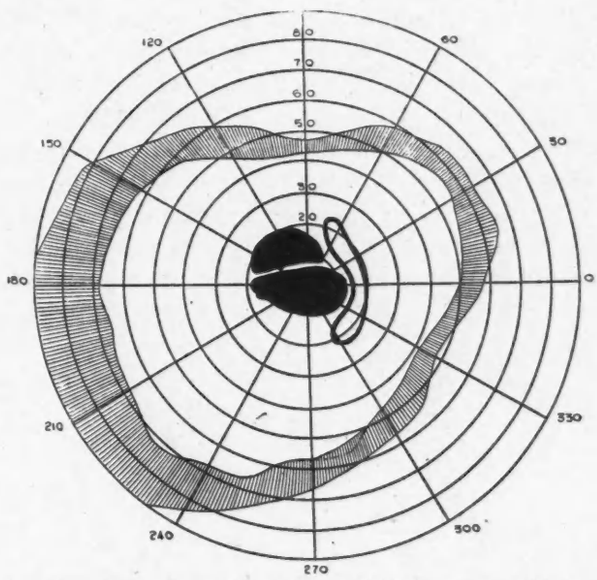

Fig. 1. (Case 14).—Vision 20/800. Note 20° depression of peripheral field temporally, colour visible only in small area nasally, large central and paracentral scotomata with very dense centres.

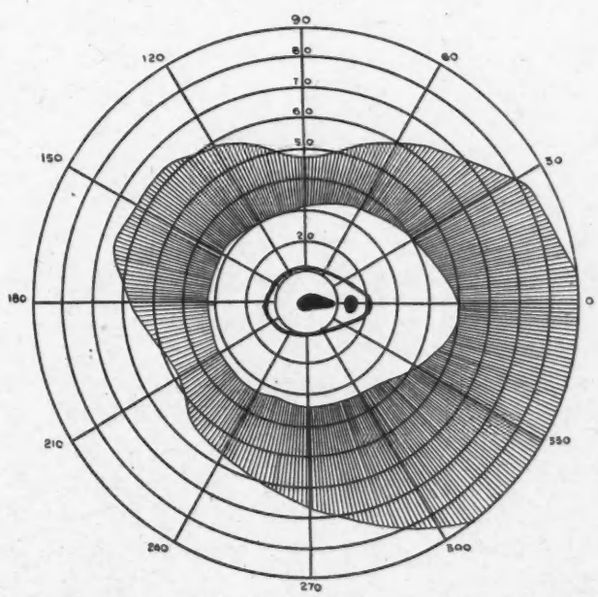

Fig. 2. (Case 54).—Vision 20/300. Note peripheral contraction of field with typical dense centro-cæcal scotoma.

Field findings.—The perimetric findings, as would be expected, yielded the most striking results. The peripheral fields were examined on a perimeter (330 mm. distance) with a 2 mm. white test object, and 6 mm. red and green test objects. The central fields were examined on a black tangent screen at 2,000 mm. distance, with a 2 mm. white test object and a 6 mm. red test object. No attempt was made to map out the full extent of the 2/2,000 isopter, but merely to find the extent of the central scotoma with this visual angle.

An average moderately severe case showed findings of the following nature: vision 20/120; peripheral fields slightly contracted, *i.e.*, for a 2 mm. white test object a temporal constriction of 10 to 15°, for a 6 mm. red test object 5 to 10° concentric constriction; and a dense centro-cæcal scotoma. The scotoma had fairly steep margins, slightly larger for red, but about the same size with the larger 10 mm. white (10/2,000). A blurred region extended from the tail of the scotoma towards the blind spot (Figs. 3 and 5A).

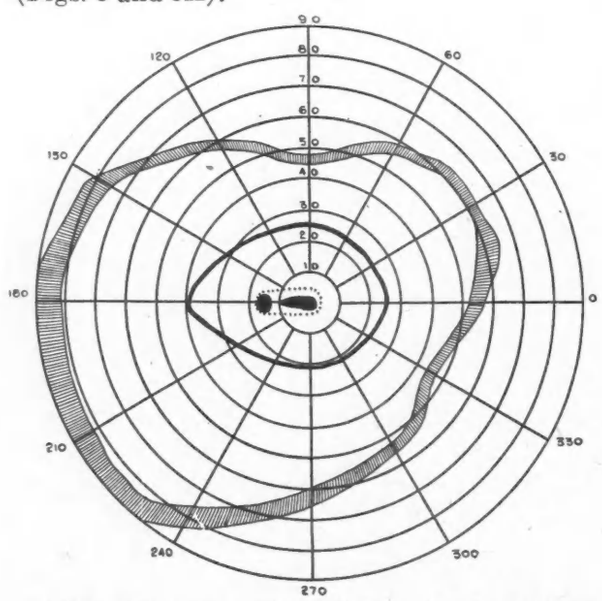

Fig. 3. (Case 58).—Vision 20/200. An average type severe case with no peripheral field contraction but showing dense centro-cæcal scotoma, which is larger for red test object.

The central scotoma is the cause of the man's visual disability. It is negative as would be expected and thus does not show as a black spot in his visual field, but like the blind spot it is a blank or negative area. It is very dense and even a bright light does not show its centre.

(*a*) *Peripheral fields.*—It will be seen that on the whole the peripheral fields were not much affected. As the temporal field is the first to fall in field depression, this was used as the basis of measurement (10, 20, and 30°). It will be seen that 24 cases showed no peripheral loss for white. Our worst cases showed only 20° temporal loss for white. Of the 4 cases with 30° temporal loss or rather severe constriction of visual fields the acuity range was O.D. 20/200; O.S. 20/70; O.D. 20/40; O.S. 20/25. Most of the severe cases showed a 10 to 15° temporal loss for a 2 mm. white test object. A few cases examined had only an apparent colour field constriction, but these were discarded unless there was some other finding such as loss of visual acuity, or paracentral scotoma. Using the 10 mm. object many of these constricted fields enlarged to a normal full size.

TABLE II.
VISUAL FIELD STUDIES IN CASES OF PARTIAL OPTIC ATROPHY FROM MALNUTRITION

Pheripharal loss (71 cases) 2/330 white, 6/330 red						*Central Scotoma (81 cases) 2/2000 white*			
White			*Red*			*Centro-cæcal*		*Para-central*	
10°	*20°*	*30°*	*10°*	*20°*	*30°*	*Lge.*	*Sml.*	*Lge.*	*Sml.*
43	24	4	31	30	7	33	39	4	5

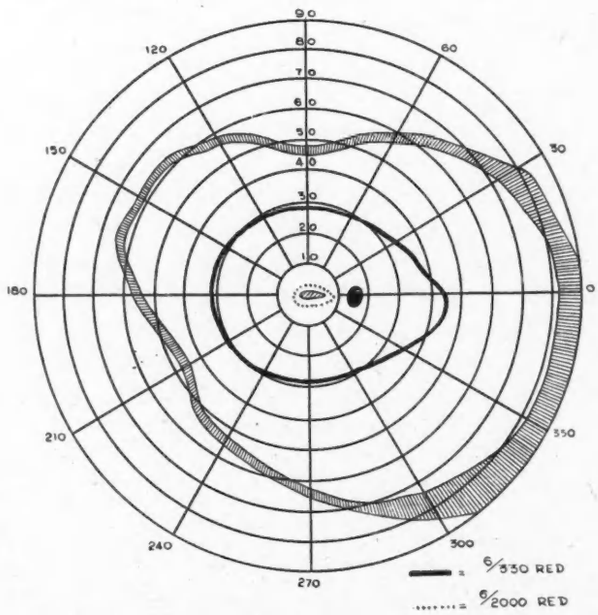

Fig. 4. (Case 78).—Vision 20/30. An average very mild case, normal peripheral fields, centro-cæcal blurred relative scotoma slightly larger for red.

(*b*) *Central fields.*—A central scotoma or central blur was so constant a finding that a man was suspected of other conditions unless this sign was present. Thus 5 cases of high refractive error which corrected only to 20/25

of 20/30 were discarded as having no atrophy because of the lack of a central scotoma.

Central scotoma in the mild cases were very difficult to detect. A 2 metre distance was necessary to demonstrate small defects. In those with 20/25 or 20/30 vision the man saw merely a blurring of the 2 mm. white test object as it approached fixation. This blurred region was small but had a tailing towards the blind spot. Usually a minute point or nucleus was to be found where the object disappeared. These cases with definite blurred areas were considered scotomata.

Fixation is difficult with a central scotoma, and the most satisfactory method we found was to place ordinary straight pins through the screen to form a circle around the central fixation point at about the 2½° ring. Most men could keep the eye centred on the middle of this ring although they could not see the fixation point.

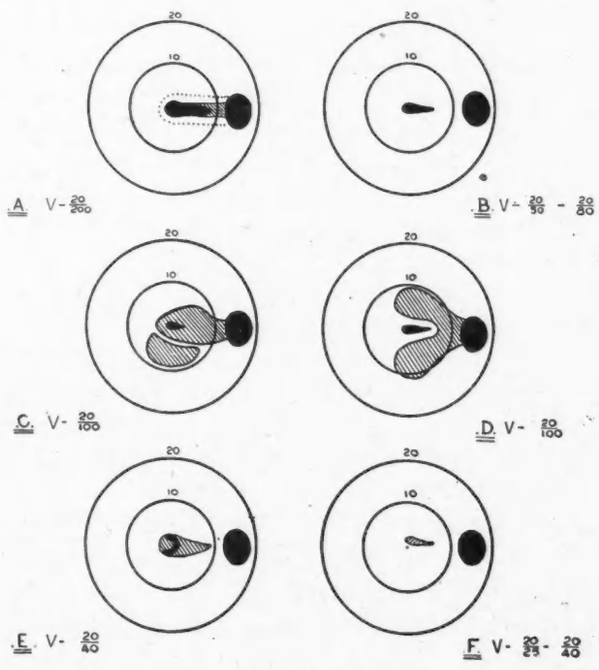

Fig. 5.—Variations in central scotomata. (A) Typical scotoma of 25 severe cases showing absolute centro-cæcal scotoma with blur extending to blind spot (2/2,000); scotoma slightly larger for red test object. (B) Smaller dense centro-cæcal scotoma in 16 milder cases. (C) Centro-cæcal and inferior paracentral scotomata with dense nucleus in 3 cases. (D) Dense centro-cæcal scotoma with arcuate defect above and below. (E) Absolute ring-type paracentral scotoma with blurring tail to blind spot in 4 cases. (F) Faint central or paracentral blurring (relative scotoma) with 2/2,000 white test object.

It will be seen that 14 cases did not have a scotoma (Table II). These men all had some loss of visual acuity and were missed during earlier examinations when only 1 metre distance was used. We feel that a re-examination at a 2 metre distance would demonstrate a central scotoma of some degree in most of these. This fact was brought out in our recheck carried out subsequently.

Figure 5 shows variations of the scotomata found. Seventy-two cases showed the centro-cæcal scotoma of varying degree of intensity from A to B to E. The size of the scotoma was directly related to the loss of visual acuity, for example 20/200 equals scotoma 2° x 5°, 20/100 equals scotoma 1° x 3°, 20/25 equals central blur ½° x 2°, etc.

ETIOLOGY

The following is a discussion of the various factors of this debatable point. The supposition was, when we first saw these cases, that they were optic atrophy due to "beriberi". Williamson[3] working in Singapore before the war saw hundreds of severe cases of beriberi but no optic atrophy. Goldsmith[2] in West Africa treating native cases of optic atrophy which he has labelled "beriberi" was very discouraged at their response to vitamins. Crawford[1] says that in working with our men in Hong Kong, although the response of the vision to vitamins was very poor, the beriberi would respond somewhat. He said that an increase in diet appeared to improve the vision. Adamson,[4] who is investigating our cases from the general medical standpoint, finds only slight relationship between the residual peripheral neuritis and optic atrophy.

As stated earlier, it was felt possible that some infection such as dysentery, diphtheria, malaria, jaundice, etc., had precipitated the optic neuritis. However, no such connection has come to light, and many of our cases were fit enough for work parties when the visual trouble commenced.

It was learned that many of the men had smoked "shag" or some crude tobacco substitute which caused palpitation. This point was investigated because of the similarity of this condition and tobacco amblyopia, but no close connection was found. One of our worst cases did not take up smoking until he returned to Canada. Others admitted using shag only

in the quantity of one or two loosely rolled cigarettes a week. None admitted having more than three cigarettes of this mixture a day. Ordinary Japanese cigarettes, of course, were scarce, and alcohol unobtainable.

We felt that bright light might be a factor, as many of the cases were apparently ushered in by severe photophobia. A check was made to see if our cases occurred largely in blue eyes or light coloured irides. Here again there seemed no definite connection. Three cases occurred in dark-skinned North American Indians.

A point of interest is that prisoners of war in Europe were also starved, and weight losses ran to 40 or 50 pounds. None, in our experience, suffered optic atrophy or beriberi.

Why does the disease appear to be confined to the tropical region of Asia and Africa and in people living largely on rice? Elliot[9] states that in Japan the treatment is to withdraw rice and substitute beans and barley. On this diet the scotomata diminish rapidly but return when the ingestion of rice is resumed. Is there some toxin present in rice or mouldy rice? Moore,[10] in West Africa, who reported this disease in natives in 1932, feels the case against rice is rather slim, because his cases lived largely on manioc.

We have been unable to determine the common factor which will explain why 20% of a group of men subjected to the same restricted diet, same mental stress, and same living conditions and diseases, developed bilateral retrobulbar neuritis, leaving them with some degree of optic atrophy. The simplest explanation would seem to be that certain optic nerves are biologically or congenitally weak. When subjected to the causative factor, *i.e.*, "B" avitaminosis, hypoproteinæmia possibly along with a toxin in rice, these weak nerves develop neuropathy and atrophy. Depending on the degree of susceptibility, more nerve fibres perish, and those supplying the sensitive cones of the macula are the least immune. What the causative factor or factors are is not known with any degree of certainty. The question at present is being debated in the British medical journals, some supporting avitaminosis B_1, some avitaminosis B_2, some even suggesting avitaminosis A. It seems safe to postulate that it is probably an unknown B complex deficiency, associated with a hypoproteinæmia or lipæmia, with the possible addition of a toxic or inhibitory element found in musty rice.

OTHER OCULAR FINDINGS

A few other points of interest were found in the eye examination of these 375 men.

(*a*) *Accommodative asthenopia.*—Most of the men examined, whether their vision was good or bad, complained that reading produced tiring and burning of the eyes. This is muscular (intra- and extra-ocular) and seems worse in those cases having general asthenia. It seems to be slowly improving.

(*b*) *Corneal ulcers.*—Crawford tells us that 7% of the men developed corneal ulcers during captivity, mainly in 1942. In our examination we were not impressed with the number of these who were left with noticeable corneal scars. About 12 to 15 cases had superficial faint opacities of the cornea, and only in 6 of these was there any loss of visual acuity. These 6 cases developed ulcers during late 1942 which is the same time the optic atrophy occurred. In one case the ulcer progressed and the eye enucleated in 1943. Three of the 6 also showed optic atrophy in the ulcerated eye, the other eye being normal. One very odd case showed no atrophy in the ulcerated eye, but had only 20/200 vision in the other eye due to optic atrophy. Until we saw him we felt that the corneal infection had hastened the onset of optic atrophy, but in his case hyperæmia appeared to exert some protection.

In our series the eye changes attributed to vitamin A deficiency were remarkably rare.

(*c*) *Cataract.*—Only 2 cases of marked lenticular opacities were seen. These did not resemble each other, occurring only in one eye and neither case exhibited optic atrophy. One man, aged 38, had vision of 20/200 due to an anterior subcapsular lens opacity. The other man, aged 34, has vision of 20/50 due to a thin veil of opacity occurring over the anterior surface of the adult nucleus. This might have been present before enlistment.

TREATMENT

On return to Canada most of the men were treated with multi-vitamins, high protein and high caloric diet, and they rapidly gained weight. This seemed, however, to have little effect on the eye fatigue or the optic atrophy. Our main concern has been to find a means of magnifying print and enabling those with scotomata to read. Some experimenting was done with binocular loupes, large 3 to 4 inch diameter reading magnifiers, etc. The most

satisfactory reading aid has been a +6.00 to +14.00 dioptre spherical lens close to the eye. With this "monocle" in the better eye, the other eye closed and the book held at 3 to 4 inches from the eye, our 20/200 and 20/400 cases were able to read J.2 and 3, *i.e.*, newsprint. This is rather amazing but, as pointed out above, the main disability from which these men suffer is a central scotoma which is not large. One eye must be kept closed to avoid convergent strain at this close reading distance.

Most of our cases with visual acuity of 20/100 or worse have now been fitted with ordinary reading glasses of +6.00 D.S. to +14.00 D.S. for both eyes, with a detachable occluder or patch for one eye. This is easier to manipulate than a monocle and enables them to use either eye. It does not appear that Braille training will be of much advantage to this small group.

PROGNOSIS

These cases were first seen over a period from October, 1945 to August, 1946. During November, 1946, about 50 of those with optic atrophy have been rechecked. Apparently no improvement or deterioration has occurred. The accommodative asthenopia or burning sensation on reading has improved somewhat.

SUMMARY

1. Ninety-five cases of partial optic atrophy from malnutrition occurring in liberated prisoners of war from Hong Kong are reported. This is an incidence of 20%.

2. Twenty-three of these have binocular vision of 20/200 or worse, an incidence of about 4%.

3. The main finding has been a dense centrocæcal scotoma tailing towards the blind spot. The peripheral visual fields were contracted only slightly.

4. The degree of optic disc pallor has been a very unreliable means of judging the extent of optic nerve damage.

5. The etiology is discussed and the conclusion is that, besides the usually accepted hypoproteinæmia and lack of vitamin B complex, there is considerable evidence that a toxin may exist in mouldy rice.

6. The optic atrophy appears permanent and no change has occurred in our cases over a one year period.

7. A +6.00 to +12.00 D.S. monocle will enable a 20/200 case to read newsprint.

The authors acknowledge the valuable assistance of Mr. Dan Campbell for making and photographing the drawings.

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RESIDUAL DISABILITIES IN HONG KONG REPATRIATES

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ON December 25, 1941, a Canadian force consisting of the Royal Rifles of Quebec and the Grenadiers of Winnipeg, was captured by the Japanese in Hong Kong. Of these, 780 belonged to the Winnipeg Grenadiers; 654 returned to Canada in September, 1945; 140 had succumbed to forty months of hard labour, starvation and pestilence. This report presents some of the findings on examination of these men after their return.

Lieut-Col. John Crawford, R.C.A.M.C., the senior M.O. of the force and Major J. A. G. Reid[1] have written a remarkable account of the infections and deficiency diseases which preyed on the men from the beginning to end. In spite of incredible difficulties these officers accumulated and preserved most valuable clinical records. We have been privileged to study their report and against the background that it provides the present condition of the men has been assessed. Colonel Crawford summarized the important factors in producing 100% morbidity in the prisoners, as follows: (1) Full Canadian rations were abruptly reduced to a grossly deficient diet. Fat, animal protein, vitamin A, the B complex and total calories were especially low. (2) Infections were rampant; dysentery, malaria, diphtheria and parasitic infestation maintained a high incidence. (3) Exhausting physical labour was

demanded. (4) Medical supplies and equipment were completely inadequate at all times.

The chief evidences of deficiency were emaciation, peripheral neuritis, œdema, cardiac symptoms, skin and mucous membrane lesions, and visual disturbances. These first began to appear three months after capitulation and continued throughout the period of captivity, becoming better or worse with fluctuation in food supply.

On the return of the men to Canada in the autumn of 1945, most of the acute deficiency had cleared up but there were many chronic residual signs and symptoms. The medical staff of the D.V.A. Hospital in Winnipeg has studied about five hundred cases during the past year. For about two months before and during the period of observation all the men were on a good diet and also took supplemental multivitamin pills by mouth. What follows is an analysis of the findings in 300 cases. These cases were not selected but since they included those who came home as hospital cases and those who soon found their way into hospital they may show more evidence of disease than the whole group would have done.

The symptoms and signs fall naturally into five groups, namely: gastro-intestinal, abnormal sweating, cardio-vascular, optic atrophy and "peripheral neuritis".

Gastro-intestinal System

Two hundred and nine men (70%) complained of one or all of the following symptoms; anorexia, nausea, belching, distension, surfeit, pain, flatulence. The general picture was one of mild hypertonic dyspepsia but anorexia overshadowed all other subjective digestive complaints and deserves individual consideration.

Almost one-half of the men complained of loss of appetite and each gave a similar history. While in Japan there was much loss of appetite, as a result of infections, starvation and disgusting food. Most men thought that their appetites in Japan were essentially good when their health was not very bad. They practically all agreed that on release when food became available they had ravenous appetites and ate enormously for a time. This is attested by the fact that most of them reached new highs in weight. Then, after two or three months of good living, their appetites suddenly failed and many of them had an acute revulsion to food, especially sweets. Many insisted that the anorexia was complete in the morning and some were unable to face food till evening.

In most cases (80%) the anorexia was associated with other dyspeptic symptoms, *e.g.*, nausea, full feeling, belching, flatulence and general abdominal distress, even after small meals. In some (20%) anorexia was an isolated symptom. In most cases it resulted in a loss of weight to the pre-war level or below, but was never so severe as to constitute a real nutritional hazard or to justify hospitalization. In all cases, it is slowly improving and will not be a permanent disability.

Looseness of the bowels was fairly common (9%); constipation was uncommon (2%). It is not possible to be sure whether or not the bowel condition was a legacy of dysentery which was almost universal in Hong Kong and Japan. It was felt that it was more frequent but of a similar type to the condition found in those who returned from the Mediterranean. The diarrhœa was very commonly of the early-morning, post-prandial type, and for that reason it was thought that it might be associated with achlorhydria. This was rarely found to be the case. Also it was found that these features (early morning and post-prandial movements) are common in most cases of chronic looseness and do not characterize lienteric diarrhœa as so often stated.

Little evidence of other diseases of the gastro-intestinal tract was found. Barium series were done on a large number but no specific abnormality could be discovered. There was no evidence of segmentation of the small bowel which is found in some types of vitamin deficiency. Gastroscopic examination was done on a few who had more severe symptoms and this also was negative. Only one of the 300 developed a peptic ulcer (duodenal) while in Japan. This is surprising in view of the common association of ulcers with emotional stress. Certainly these men suffered much anger and frustration of the sort that might produce visceral effects. Possibly the low diet and the defective hydrochloric acid secretion counterbalanced the psychiatrical factors favouring ulcer formation. On return to Canada several developed ulcers.

It is usually stated that general nutritional deficiency, especially of the sort called beri beri and pellagra produce low hydrochloric acid (Bloomfield and Polland[2]). Hibbs,[3] who

observed American prisoners of war in Bataan, says "usually no free HCl on fasting and low in other samples". Evidently histamine was not used. In the present study there were 132 full gastric analyses done with the following result:

Fasting anacidity	50%
Anacidity after alcohol	22%
Anacidity after histamine	6%

These figures are certainly high, especially for anacidity after alcohol. The usual percentage of anacidity after an Ewald meal in males between 20 and 40 is 4.7 to 7.5%. The post-histamine anacidity is given as 2.9 to 3.5 (Bloomfield and Polland[2]). This low acid secretion may be regarded as being due to vagal degenerative changes; the men were, in effect, suffering from a partial vagotomy. We have insufficient evidence to determine whether or not the achlorhydria is temporary or not. Judging from the experience of others and from the fact that the histamine figure is not very high, one would guess that it is not permanent.

SWEATING

An abnormal tendency to sweat was a common symptom (76%). As with anorexia, it developed within a few months of return to normal diet. It also might have been a recurrence of an earlier symptom. Most of the men stated that in captivity they perspired a great deal, but how much of this was due to nutritional deficiency and how much to weather conditions and infection is impossible to determine. The complaint, when examined by us, varied from axillary and palmar sweating on excitement or effort to profuse drenching attacks of hyperhidrosis without provocation. In some cases these spontaneous attacks were most striking. The face, neck and upper part of the trunk were chiefly involved and during attacks, sweat literally dripped from the chin and nose. There appeared to be no relationship between this symptom and others. Sometimes it was an isolated sign and sometimes men who had many other signs and symptoms had no abnormal perspiration. It was not associated with anorexia, optic atrophy, absent tendon reflexes, paræsthesias or cardio-vascular symptoms in a higher proportion than could be explained by chance. Increase in sweating is usually complained about when the men return to work, but in general there is steady improvement.

VISUAL COMPLAINTS

Almost half of the whole number (48%) complained about their eyes. The chief complaints were photophobia, watering, fatigue, blurring and inability to read. Examinations showed: (1) A few corneal scars—likely a legacy from xerophthalmia in Japan. (2) A good deal of muscle imbalance—probably a part of general degenerative changes in muscles. (3) A few cases of correctable astigmatism, etc. (4) A large number with contracted visual fields and central scotomata and some with obvious atrophy.

Seventy-nine men (26% of the whole group) had sufficient atrophy to interfere with vision. In most of these (46) the defect was slight (20/50 or better); in 16 it was moderate (better than 20/200); in 17 (nearly 6% of the 300) vision was 20/200 or worse and of course was not correctable. It is the one disability that is not improving.

Colonel Crawford records that the first cases appeared in September, 1942, 9 months after capture, and that the incidence was at its peak in the spring of 1943. Over 60% of the whole force was affected at some time during internment. In each case, vision continued to deteriorate for a month or two and then gradually improved. Many men who state that they were almost blind in 1942 now have good vision and no residual atrophy. Unfortunately, there is very little known about the fundus during the acute stage. There was no ophthalmoscope at Hong Kong. Major A. E. Hibbs[3] of the U.S. Medical Corps reports a similar condition in American troops held by the Japanese in Bataan. He states simply that the disc was blurred during the acute period and in the course of 3 or 4 months this gave place to signs of atrophy in a proportion of the men.

CARDIO-VASCULAR SYMPTOMS

Complaints of dyspnœa, palpitation and precordial pain were very common (72%). This was a continuation of symptoms that were almost universal while the men were prisoners and were attributed to beri beri. At that time, œdema was almost always associated. It was found both in Japan and Bataan that œdema, when it first appeared, responded well to thiamine. Later on, when chronic, the œdema failed to clear up with thiamine but was quickly reduced by increase in animal protein in the

diet. No blood chemistry of course was possible in P.O.W. camps, but it seems certain that much of the chronic œdema was due to hypoproteinæmia. On return to Canada, a few of the men still had slight residual dependent œdema. By the time they reached Winnipeg there were only a few cases and in them the blood proteins were normal, so that the œdema was attributed to the heart. Only one case presented all the classical evidences of a beriberi heart, *i.e.*, general enlargement of the heart shadow, low E.C.G. amplitude, and œdema that could not be otherwise explained. All œdema disappeared in the course of a few months.

The persistence of subjective cardiac complaints was not associated with any signs of organic cardio-vascular disease. Arrhythmias, hypertension, murmurs and E.C.G. changes were very rare. In general the pulse rate impressed us as being rather slower than what is usually found in returned soldiers in hospital. The fact that no essential hypertension was encountered is surprising in view of the emotional background. Symptoms referable to the heart are gradually disappearing as general muscular tone is recovered.

Neurological Symptoms and Signs

Paræsthesias were found in 83%. This was almost always limited to the feet and legs and was bilateral and symmetrical. The sensations were variously described as "tingling", "burning", "aching", "numbness", "sharp shocking pains" and "cramps". Not uncommonly, men stated that their legs felt as if they were tightly bandaged. The distress was always worse at night, particularly after much activity. Many of the men said the trouble became worse for some time after return to Canada. Some who had very little trouble for many months had a recurrence of pain on going to work. This exacerbation or recurrence of paræsthesia was noted by several medical officers in Japan when adequate diet was given. The paræsthesias are very slow to disappear. After a year in Canada the improvement is estimated to be about 50%.

Positive neurological findings are shown in Table I.

Forty-two per cent (42%) of the whole group had no positive findings, though some of these had paræsthesia. Also a few had such positive signs as absent knee jerks and still had no paræsthesia. Only 20% of the whole group had more than three of the signs listed, and only a small percentage will have a residual disability.

Table I.

Incidence of Neurological Signs

	No.	%
Absent tendon reflexes	60	20
Impaired vibration	69	23
Impaired light touch	64	21
Impaired deep touch	25	8
Impaired superficial pain	78	26
Impaired deep pain	30	10
Impaired position sense	40	13
Impaired temperature sense	66	22
Romberg	69	23
Optic atrophy	79	26

It seems probable that the whole sensory tract from the posterior columns to the peripheral nerves is involved. In some cases paræsthesias and sensory changes predominate and it may be regarded as having borne the brunt of degeneration in peripheral nerves. In a few cases ataxia, loss of postural sense and Rombergism dominate the picture so that they completely simulate tabes dorsalis. These are very slow to improve and it is probable that gross damage to posterior columns has occurred. No cases of spasticity nor any evidence of lateral column involvement has been found. There were a few cases of nerve deafness which was usually so slight as to cause no disability.

The neurological signs have shown definite improvement since return to Canada. Comparison of several examinations over a six-month period show about a 35% improvement of such physical findings as absent tendon jerks and impaired vibratory sense.

Probable Site of Lesions

Throughout the clinical study we were impressed by the apparent subdivision of positive findings into five groups: abnormal perspiration, gastro-intestinal symptoms (including anorexia) cardio-vascular symptoms, optic atrophy and neurological signs in the legs. A study of the coincidence of various signs and symptoms has been made in an effort to determine which of these occurred together more frequently than might be accounted for by chance (Tables 2 and 3). For example: abnormal perspiration occurred in association with anorexia 117 times and the chance coincidence is 112. Perspiration and optic atrophy were found together in 61 cases; the chance

coincidence is 60. In a similar way the coexistence of sweating with all the other signs was determined and it was found that chance alone could explain the overlap in each case. This evidence indicates that the lesion responsible for hyperhidrosis is separate from the other lesions and is in the sympathetic nervous system.

Using a similar technique the relation of the gastro-intestinal and cardio-vascular groups was correlated and it was found the chances were 100 to 1 against simple coincidence (Tables II and III). This implies that these two groups are related pathologically and have a similar cause or some common elements in their etiology. Their mutual participation in vagal nerve supply suggests that degeneration changes in the vagus may be the common factor. Neither gastro-intestinal or cardio-vascular symptoms showed more than a chance coincidence with the other groups of symptoms.

Before this statistical analysis it was felt that the optic atrophy was an isolated lesion. Many cases with advanced atrophy were otherwise well and some with much disability elsewhere had normal eyes. This pre-conceived idea was upset by the analysis. The association of optic atrophy with loss of posture sense was so common that the probability of its being chance was a thousand to one against. The same held for loss of vibratory sense. The coincidence of optic atrophy with Rombergism and absent tendon jerks showed only a 1% chance of being accidental. Other neurological signs and symptoms also showed significant overlapping with optic atrophy.

Neurological signs in the lower limbs overlapped strongly with one another and with optic atrophy but not with a history of diphtheria, gastro-intestinal symptoms, cardio-vascular symptoms or sweating.

All this suggests that there were three fundamental and separate lesions; one causing sweating (sympathetic system); another causing gastro-intestinal and cardio-vascular symptoms (vagus); and one causing optic atrophy and degeneration in the afferent tract from the limbs (peripheral nerves, posterior roots, posterior columns and the optic tract). Since all symptoms except the optic atrophy are improving, it is safe to infer that the injury is largely peripheral. Since the optic "nerve" is anatomically a tract it has shown no evidence of regeneration.

PROBABLE CAUSES

Though three fairly distinct lesions may be presumed it does not follow that there were

TABLE II.

For all the combinations of symptoms on this Table the difference between the observed and the probable frequency is *significant*. The last column shows the approximate probability of a difference as great (or greater) occurring by chance.

Pairs of symptoms	*Observed frequency*	*Probable frequency*	*Difference*	*Probability*
				%
(1) Anorexia and other g.i. symptoms	119	89	30	<0.1
(2) Rombergism and loss of postural sense	28	9	19	<0.1
(3) Optic atrophy and loss of postural sense	31	10	11	<0.1
(4) Optic atrophy and loss of vibratory sense	31	18	13	≏ 0.1
(5) Optic atrophy and Rombergism	30	18	12	<1.0
(6) Optic atrophy and absent jerks	25	16	9	≏ 1.0
(7) Cardio-vascular and g.i. symptoms	152	130	22	≏ 1.0

TABLE III.

For all the combinations of symptoms on this Table the difference between the observed and the probable frequency is *insignificant*. The last column shows the approximate probability of a difference as great (or greater) occurring by chance, except when the difference is so small that the probability is obviously not worth calculating.

Pairs of symptoms	*Observed frequency*	*Probable frequency*	*Difference*	*Probability*
				%
(1) Absent jerks and g.i. symptoms	44	36	8	≏ 15.0
(2) Absent jerks and diphtheria	17	13	4	≏ 25.0
(3) Loss of vibratory sense and anorexia	38	34	4	≏ 47.0
(4) Anorexia and abnormal perspiration	117	112	5	≏ 56.0
(5) Optic atrophy and anorexia	41	39	2	
(6) Optic atrophy and abnormal perspiration	61	60	1	
(7) Optic atrophy and diphtheria	17	17	0	

three separate deficiencies each of which had a selective action; the segregation into separate groups is not sufficiently clear-cut for such a conclusion. In the production of the final picture as we have found it, there are many possible influences which varied widely from case to case and which are to a large extent imponderable. Though all of the men were subjected to forty months of nutritional stress, the degree and type of actual deficiency must have differed widely in different individuals, depending on how expert the man became at scrounging, the opportunity for extra food that his particular job presented, his ability to stomach food no matter how repulsive, the amount of work he did or could escape, the degree and type of his infections, etc. All these factors no doubt produced a wide range in the actual amount of starvation. Also, inherent and acquired individual characteristics must have had a bearing on the type of tissue reaction even if the diet defect were identical in each case. The only single factor the influence of which could be measured was age. The ages of the men on going to Hong Kong varied from 16 to 55. Young men were usually convinced that they could "take it" better than their elders; older men frequently held the opposite view. Table IV shows the age distribution of the 300 cases in half decades and also the age distribution of those with some common signs and symptoms. It will be seen that no symptoms especially selected the young or the old.

The actual causes of the various lesions are difficult to determine. We have seen only residual effects; the more acute and more specific vitamin effects had disappeared; there was no cheilosis, glossitis, stomatitis, conjunctival or corneal changes and no skin lesions. The signs and symptoms can be accounted for by assuming the presence of a widespread neuropathy. Clinically it is not dissimilar from the condition endemic in many parts of Asia and described as "dry beri-beri", as far back as medical literature goes. Optic atrophy appears much more prominent than older descriptions indicate. Earlier writers make only a few casual references to visual defects apart from the more superficial and common changes associated with vitamin A and riboflavin deficiency. The difference may be due to atrophy having been partly overlooked in the past; or our soldiers may have been more susceptible to this lesion than Orientals; or there may have been unusual local deficiency in some of the accessory food factors. In any event the cause is closely related to that of the other classical signs of beri beri as shown by their coincidence.

The complete picture as we found it must be ascribed to residual nerve tissue injury due to B complex deficiency. We hesitate to guess which factor or factors of the complex predominated.

Ultimate Disability

Continual improvement in all signs and symptoms, except optic atrophy, is found in all these men. The majority have now returned to normal activity and productive employment. Besides the 6% who will be greatly handicapped by optic atrophy, there will be about an equal number with residual permanent neurological changes that will limit their activities.

Table IV.

Relation of Age to Various Findings
Percentage Age* Distribution of Various Signs and Symptoms

Age in years	*15 - 19*	*20 - 24*	*25 - 29*	*30 - 34*	*35 - 39*	*40 - 44*	*45 - 49*	*50 - 54*	*55 - 59**
Whole group (300).....	9.3	37.7	19.6	16.0	11.0	4.0	2.3	0.0	0.7
Anorexia (147).....	8.8	38.7	21.7	12.9	11.5	3.4	2.7	0.0	0.0
Paræsthesia (250).....	8.0	35.6	21.6	15.6	12.0	3.6	2.4	0.0	0.8
Reflexes (60).....	10.0	42.0	15.0	17.0	15.0	0.0	0.0	0.0	0.0
Optic atrophy (79).....	6.0	36.0	14.0	17.0	16.0	5.0	4.0	0.0	0.0

*Age on going into Hong Kong is used.

The statistical studies were made by Professor I. McLaren Thomson and he is entirely responsible for Tables I, II and III. We wish to thank him for valuable help and for having demonstrated the inter-relation of the various groups.

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PREOPERATIVE AND POSTOPERATIVE CARE OF INTESTINAL OBSTRUCTION

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THE improvements noted in the mortality rates in intestinal obstruction during the past 20 years have been due, in large measure, to refinements in preoperative and postoperative treatment. It is the purpose of this presentation to discuss the various measures that are now brought to bear upon this condition, and to review the factors that must be combated.

Disturbances of Water and Electrolyte Balance and Nutrition of the Patient

It need not be emphasized that the fluid loss consequent upon vomiting and the collection of fluid in the dilated loops of gut proximal to the obstruction constitute the greatest menace to the patient's life, and that the correction of these losses is a matter of prime consideration. Perhaps less obvious is the fact that, from the time of the onset of the disease until recovery has taken place and the patient is able to take a full diet, there is continual drain upon his nutritional reserves and that if, from the beginning, steps are not taken to minimize these losses, a serious state of malnutrition may result and the patient will be subject to the complications of that condition as well as to the complications of the intestinal obstruction itself. At the outset the questions that must be answered in any given case are: (*a*) what is the present condition of the patient so far as his state of hydration is concerned? (*b*) What volume and what types of fluid must be administered to correct this state? (*c*) Following correction of the initial imbalance, what volume and type of fluid must be given to maintain hydration and nutrition?

These questions demand answers regardless of the plan of operative treatment; for even in a case in which early operation is indicated and in which, at operation, the mechanical obstruction can be relieved, a state of ileus will almost certainly persist well into the postoperative period, creating a situation comparable to that which will obtain in the case in which operation is deferred and the condition of actual mechanical obstruction allowed to remain.

Of the indices that can be used to determine the state of hydration of a patient at any given time, the following are probably the most useful: hæmatocrit, hæmoglobin or red blood cell count; non-protein nitrogen; blood chloride level; CO_2 combining power; serum sodium; serum pH.

The information supplied by these tests is undoubtedly important, but by themselves, they do not give a precise picture of the state of the patient, for it is likely that no significant deviation from the normal values will be found until the obstruction has existed for many hours and the fluid loss has been great. When considered with the clinical history and physical findings, however, they form a most useful base line with which the effects of subsequent therapy may be compared.

Formulæ have been devised from which an estimate of the fluid requirements of a patient can be calculated. The most commonly quoted is that proposed by Coller and Maddock in which from the weight of the patient and his blood chloride level the amount of NaCl which he needs to restore his values to normal is worked out. The value of such formulæ is questioned on the following grounds. The patient may need fluid even though his blood chloride level be normal; also during the course of the administration of the calculated amount of fluid, the position may change rapidly due either to further loss or to gain due to reabsorption of fluids following relief of the obstruction, necessitating so many changes in the plan that the original calculation is rendered valueless.

For these reasons we have not used any formula. It has been our practice to commence intravenous therapy as soon as the diagnosis of obstruction is made and the blood for the original tests has been taken. The choice of fluid lies between blood, plasma or serum, dextrose in saline and sodium lactate. If there is any evidence of strangulation or if early operation is contemplated plasma is given followed by blood and then glucose saline. If, on the other hand, there are signs of dehydration but no evidence of strangulation and it is planned to withhold operation for a time, glucose saline is started and continued at a rate calculated to provide approximately 4,000 c.c. in the first 24 hours. If it can be shown by means of the blood findings that an acidosis exists, sodium lactate or sodium bicarbonate

should be given in addition to the sodium chloride in the proportion of one part of the former to two parts of the latter.

If the blood pH is normal or is on the side of alkalosis then sodium chloride alone should be given. To date we have not had the laboratory facilities to provide accurate information on the acid base equilibrium, but there is no doubt that if these determinations can be obtained, a more precise choice of fluids can be made.

During this time repeated observations of the condition of the mouth, the skin, the lungs are made and the urinary output is measured. At the end of 24 hours, the position is re-assessed and further therapy planned. Here again the question of "how much" and "of what" is raised. Should one follow the commonly recommended plan of providing so many c.c. per unit of body weight? It would seem that the fluid requirements depend upon so many things, (the patient's temperature, the amount of fluid loss by the various routes, the humidity of the environment, etc.) that it is not logical to base one's estimate upon the body weight alone. Indeed, so complex is the problem that one wonders if, at our present state of knowledge, it is possible to estimate with any degree of accuracy a patient's fluid needs.

If it is accepted that accurate measurements cannot be made, one must then fall back upon a routine which has been shown to give satisfactory results in the average case and to vary from this routine as the clinical and laboratory evidences suggest. The routine that we have followed is to give 2,000 c.c. amigen in 5% glucose and 1,000 c.c. 10% glucose in saline, providing:

TABLE

	NaCl gm.	*Prot.* gm.	*CHO* gm.	*Cals.*
1,000 c.c. 10% glucose in saline	8.5		100	400
2,000 c.c. amigen in 5% glucose	4.0	70	100	680
	12.5	70	200	1,080

This is not ideal, for both the protein and caloric yields are considerably below the desired level. At the same time, it would not appear wise to increase the volume of these fluids sufficiently to supply enough calories.

Other methods have been reported, such as, the administration of more concentrated glucose and of alcohol intravenously, but with these we have no experience. A review of our own small series of cases of obstruction in the past year reveals that from the point of view of mortality a regimen such as outlined above yields satisfactory results; but without exception these cases have lost weight and strength to such a degree that we realize that the method leaves much to be desired. It goes without saying that throughout the entire period of parenteral therapy the most careful check upon the clinical state must be kept. Once equilibrium has been established, it is usually sufficient to rely upon clinical evidence, though it is useful to check the blood findings every 48 hours or so.

That a large urinary output is not always indicative of a satisfactory fluid state was brought to our attention recently by two cases, who, in spite of the fact that they were putting out in the region of 1,800 c.c. urine daily, showed all the clinical evidences of dehydration. In each case the blood chloride level was well below normal (the patients were receiving amigen intravenously, the chloride content of which is low) and it was interesting to see the urinary output drop when large quantities of sodium chloride were given intravenously.

If it is anticipated that oral feedings cannot be instituted for a few days, it is advisable to administer blood or plasma at least every other day during this period. It is also probably advisable to commence the administration of vitamins early although the necessity of doing so is open to question. We would urge it on the grounds that the patient who develops intestinal obstruction may well have a degree of hypovitaminosis prior to the onset of obstruction, and in view of the fact that even if such a state does not exist beforehand the patient may become deficient in some of the vitamins (particularly thiamine) within a matter of two weeks or so.

DISTENSION

Efforts to overcome distension rank in importance with those to replace fluid loss. The Miller-Abbott tube is now almost universally used and there is no question that when it functions efficiently, its beneficial effects are dramatic. All too often, however, the tube will not progress beyond the pylorus. We have not had any worthwhile results from manipulating the tube under the fluoroscope and we have not used any of the magnetic devices that

have been described. We have thought that successful intubation has been obtained more frequently since we have followed the method of weighting the balloon with mercury as described by Harris. In a review of cases it appears that the tube will pass if given sufficient time and that during the time that it remains in the stomach it will, if constantly supervised, keep that organ deflated and help to prevent further distension. Once the tube has passed into the small intestine we have left it in place until the obstructive symptoms have been relieved for at least 48 hours and the patient has been taking nourishment by mouth with the tube clamped off. On occasions we have had to commence suction again after it had been discontinued when it was thought that the obstruction had been relieved and for this reason we prefer to leave the tube in place until all reasonable doubts as to the relief of the obstruction have been dispelled.

PERITONITIS

The risk of peritonitis in cases of obstruction is great, particularly in the strangulating types, but it is also present in the non-strangulating types in which an operative procedure is carried out. Recent publications on the use of penicillin in the treatment of peritonitis from other sources would lead one to believe that this drug should be given to all cases, even if only for prophylactic reasons.

Harper and Blain[1] in 1945 re-investigated the rôle of bacteria in producing death in dogs having isolated, obstructed jejunal loops. They found that all the 15 control dogs died within 6½ days. All of the 15 dogs in whose isolated loops penicillin was introduced were protected for 9 days, while 93% were protected for 13 days and 60% were protected for over a month. Five dogs treated parenterally with penicillin were protected for more than 18 days. They observed that marked distension of the loop occurring in the presence of bacteriostatic agents is compatible with life. In the absence of distension of the loop an abundant bacterial flora uninhibited by the bacteriostatic agents is compatible with life. These experiments indicate that distension must be present before infection of the intestinal wall by the normal intestinal flora. If this evidence is correct, it affords another good reason for giving penicillin to every obstructed patient. The question of dosage is difficult to answer. We have been impressed with the effects of large doses of penicillin (100,000 units q.2h.) in cases of peritonitis of appendiceal origin and would probably use this dosage in any individual with severe obstruction.

We have no reason to believe that administration of oxygen in the ordinary hospital oxygen tent has any definite effect upon the distension, possibly because the concentrations of oxygen achieved are not great enough, owing to the frequent interference due to the handling of the gastric suction apparatus, and the intravenous therapy, etc. However, we have felt that administration of oxygen is a valuable means of therapy in all seriously ill abdominal cases and have used it routinely, not so much for the possible effect upon the distension, but for the comfort it affords due to the coolness and its effects in decreasing respiratory effort.

PULMONARY AND VASCULAR COMPLICATIONS

Pulmonary and vascular complications are no less common in cases of intestinal obstruction than they are in any abdominal disease from other causes. Our attention, therefore, should be directed towards the prevention of these complications. While it has been our practice to get patients up early after most intra-abdominal surgical procedures, we have not made a practice of urging early rising in patients with intestinal obstruction, because in the few attempts that we have made, the patients appeared to be more uncomfortable as a result. At the same time no harmful results have arisen from prescribing bed exercises. Respiratory and extremity exercises are commenced as soon as the patient's general condition permits. Unless the operation is of an emergency nature, the patient is instructed before operation concerning exercises that he is to perform in bed both preoperatively and postoperatively and in emergency cases, exercises are started, as a rule, on the morning following operation.

We are not in a position, as yet, to say definitely that these exercises have reduced the incidence of complications, although it would appear from the literature that such is the case, but we can say from our own experience that it is exceedingly difficult to persuade patients of the importance of the exercises. We have found that it is not enough that the doctor explain to the patient what he wants him to

do and to ask him to do it, nor does it appear to be quite sufficient to have these cases followed and supervised by the physiotherapy department. Even with encouragement from the doctors, nurses and physiotherapy department patients will frequently find ways to avoid these exercises and it is very difficult to assess the results of such a regimen when it is is so hard to find out how carefully the instructions have been followed. Nevertheless, we feel that efforts along these lines are probably worthwhile.

SUMMARY

The following regimen of ward management is carried out in cases of intestinal obstruction. Upon diagnosis based upon history, clinical findings and x-ray examination, blood samples are taken. The Miller-Abbott tube is passed and the stomach is thoroughly emptied. The tube is introduced for a distance of 60 to 75 cm. and is left in place with the suction going. The patient is encouraged to take sips of fluid. The balloon is weighted with 5 c.c. mercury and the patient is postured on his right side with the foot of the bed raised and intravenous glucose and saline is started. For this blood or plasma is substituted if the patient's condition is serious or if early operation is planned. Morphine and atropine are given to relieve pain.

Approximately 4,000 c.c. of fluid are given within the first 18 to 24 hours, then the blood examinations are repeated and further intravenous therapy planned. We have found that the administration of 2,000 c.c. of amigen in 5% glucose and 1,000 c.c. of 10% glucose in normal saline suffices for the average case. Penicillin is administered from the beginning. Vitamin injections are commenced early, as are bed exercises. If the patient's condition is serious, he is placed in an oxygen tent.

REFERENCE

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RÉSUMÉ

L'obstruction intestinale est traitée de façon routinière par le maintien d'une hydratation adéquate et la prévention des manifestations septicémiques. Pour arriver à cette fin, on pratique les examens sanguins obligatoires et on soulage la distension intestinale à l'aide du tube de Miller-Abbott; de plus, on administre par voie parentérale de l'amigène et du glucose selon un pourcentage établi par l'expérience de l'auteur, on a recours à la pénicilline préventive et l'on complète par la vitaminothérapie polyvalente.

JEAN SAUCIER

ANÆSTHETIC EMERGENCIES*

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Kingston, Ont.

THE physician engaged in the practice of anæsthesia encounters occasional situations which demand immediate action to prevent deterioration in the patient's condition. Some of these complications may be promptly corrected without any interruption or disturbance to the surgical team, while others are dramatic episodes requiring the combined skill of the entire staff in order to prevent the loss of life.

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If anæsthesia has progressed until the jaw is partially or completely relaxed, an artificial airway is in place, the stridor of laryngospasm is not present, and yet obstruction persists, the cause is probably a retroverted relaxed epiglottis which obstructs the laryngeal orifice in inspiration, and is pushed up by exhaling. This is an important valve-like form of mechanical obstruction and is not often described in the books. The treatment is simple. The anæsthetist stands by the patient's head and passes the right hand down over the base of the tongue feeling for the epiglottis with the index and second fingers. If the epiglottis cannot be felt it is probably retroverted so that by raising the base of the tongue forwards and upwards the epiglottis is flipped up into position. With the tongue held well forward, the artificial airway is re-inserted and the airway is usually re-established. An artificial airway that is too long or not properly inserted can push the epiglottis back again.

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do and to ask him to do it, nor does it appear to be quite sufficient to have these cases followed and supervised by the physiotherapy department. Even with encouragement from the doctors, nurses and physiotherapy department patients will frequently find ways to avoid these exercises and it is very difficult to assess the results of such a regimen when it is is so hard to find out how carefully the instructions have been followed. Nevertheless, we feel that efforts along these lines are probably worthwhile.

SUMMARY

The following regimen of ward management is carried out in cases of intestinal obstruction. Upon diagnosis based upon history, clinical findings and x-ray examination, blood samples are taken. The Miller-Abbott tube is passed and the stomach is thoroughly emptied. The tube is introduced for a distance of 60 to 75 cm. and is left in place with the suction going. The patient is encouraged to take sips of fluid. The balloon is weighted with 5 c.c. mercury and the patient is postured on his right side with the foot of the bed raised and intravenous glucose and saline is started. For this blood or plasma is substituted if the patient's condition is serious or if early operation is planned. Morphine and atropine are given to relieve pain.

Approximately 4,000 c.c. of fluid are given within the first 18 to 24 hours, then the blood examinations are repeated and further intravenous therapy planned. We have found that the administration of 2,000 c.c. of amigen in 5% glucose and 1,000 c.c. of 10% glucose in normal saline suffices for the average case. Penicillin is administered from the beginning. Vitamin injections are commenced early, as are bed exercises. If the patient's condition is serious, he is placed in an oxygen tent.

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RÉSUMÉ

L'obstruction intestinale est traitée de façon routinière par le maintien d'une hydratation adéquate et la prévention des manifestations septicémiques. Pour arriver à cette fin, on pratique les examens sanguins obligatoires et on soulage la distension intestinale à l'aide du tube de Miller-Abbott; de plus, on administre par voie parentérale de l'amigène et du glucose selon un pourcentage établi par l'expérience de l'auteur, on a recours à la pénicilline préventive et l'on complète par la vitaminothérapie polyvalente.

JEAN SAUCIER

ANÆSTHETIC EMERGENCIES*

A. B. Noble, M.D.

Kingston, Ont.

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postoperative pulmonary morbidity will also be removed.

VOMITING

Vomiting is one of the worst hazards encountered in anæsthesia. Aspiration of liquid vomitus during anæsthesia may cause fatal postoperative pneumonia or atalectasis and the same accident may cause rapid death from asphyxia as a result of the lodgment of solid particles in the trachea.

The time elapsing since the last meal is no guarantee of an empty stomach. Accidental injuries and sedatives will delay gastric motility for hours. These accidents occur often in healthy people—robust men injured accidentally, pregnant women in labour or undergoing Cæsarean section. Children admitted for tonsillectomy are often surreptitiously given orange juice and ice cream before admission as a guarantee of good behaviour. Patients with intestinal obstruction usually have their stomach and small bowel filled with foul intestinal contents and the patient with a secondary tonsil hæmorrhage invariably has a stomach full of well-diluted old blood.

Patients, who undoubtedly have a full stomach, require gastric lavage before anæsthesia. Unfortunately, there is no way of telling when the stomach is completely empty. Patients with intestinal obstruction must be lavaged through a Levine tube, until the return is clear, before coming to operation; and they must come to operation with the tube well inserted and functioning freely.

A colleague will sometimes want an inhalation anæsthetic while he ties off a bleeder in a tonsillar fossa. He will say; "He won't need much anæsthetic. It will just take a minute." And, just as often, it takes twenty minutes. The only safe thing to do is to administer an intratracheal anæsthetic, using a tube with an inflatable cuff, and, if the patient does vomit, he cannot aspirate anything past that.

Reflex vomiting occurs in anæsthesia at the junction of the second and third stages, either during induction or emergence. Prevention during induction depends on carrying the anæsthesia rapidly through the second stage and well into the first plane of the third stage. Induction with pentothal is of value in preventing induction vomiting.

Vomiting must be handled promptly. Get all the help possible from gravity. Lower the head and turn the head, or the whole patient, if possible, into the lateral position, suck the pharynx out well and mop it clean with gauze. After the episode is over and the throat clear, start the anæsthesia as quickly as possible, but avoid breath-holding. If breath-holding occurs, any foreign material left in the pharynx may be aspirated with the first inspiration.

The dangers of emergence vomiting are best treated expectantly. Have patients recover in the lateral position whenever possible. The reasons are obvious. One of the great advantages of a recovery room is the presence of a trained attendant and a convenient suction machine.

LARYNGEAL SPASM

Laryngeal spasm can be dangerous only if allowed to persist until manifestations of anoxæmia, often with resultant accumulation of fluid secretions and signs of shock ensue. When using a machine, the condition is usually promptly and efficiently treated by emptying the rebreathing bag and inflating the patient with oxygen. If open ether is being given, stop the operation and the anæsthetic and the spasm will usually disappear.

Persistent laryngospasm under cyclopropane anæsthesia is not an emergency, but is a nuisance complication which often persists despite the usual methods of attempting to alleviate it. Two or three c.c. of intocostrin curare, given intravenously, will usually promptly relieve it.

Following intratracheal cyclopropane anæsthesia there is often a severe and prolonged period of spasm. It is undoubtedly caused by the direct trauma to the cords resulting from removal of the tube while under the light anæsthesia. Manifestations of this condition are sometimes delayed until the patient is on the way back to the ward. The best treatment is preventive, and consists of giving the patient oxygen inhalation for two or three minutes, commencing as soon as the tube is removed, and then always making sure that no spasm is present before allowing the patient to be moved from the theatre.

PRIMARY CARDIAC FAILURE

We now come to the problem of primary cardiac failure in anæsthesia. Periodically the newspapers report the occurrences of sudden death in apparently healthy individuals, while

undergoing anæsthesia for minor surgical procedures. These tragic occurrences must often be caused by ventricular fibrillation. This condition can kill a patient with a previously normal heart. Goodman Levy's original work was done in 1912 in an attempt to explain the phenomenon of cardiac arrest under chloroform anæsthesia. He concluded that ventricular fibrillation is an important cause of sudden death under chloroform anæsthesia and Guedal has since reiterated that this condition is possible under any form of anæsthesia.

Death is rapid. A sudden outpouring of adrenaline into the system during anæsthesia can produce fatal ventricular fibrillation. The incidence is highest under chloroform. Cases have occurred under ethyl chloride and cyclopropane. Very few cases have occurred under ether.

A young robust individual is admitted for a minor procedure. The surgeon requests "just a little anæsthetic". There is insufficient time for preparation or proper premedication. The patient's suprarenals are hyperactive and this hyperactivity is increased during the second stage. Superimposed upon this, the surgeon may inadvertently incise before anæsthesia is fully established. The stage is here set for violent and sudden imbalance of the autonomic nervous system and ventricular fibrillation and death may result. Another source of excess adrenaline in the circulation may be absorption from adrenaline-soaked sponges or tampons applied to bleeding surfaces to promote hæmostasis.

Another cause for cardiac arrest under anæsthesia is cardiac inhibition caused by hyperactivity of the vagus. This phenomenon is known as vagal inhibition. During recent years, this condition has resulted in some deaths under pentothal, notably with surgical procedures on the neck.

TREATMENT OF CARDIAC FAILURE

When primary cardiac failure occurs from either of the above causes, the signs of the catastrophe are obvious. The colour of the patient suddenly turns to a gray pallor, the pupils dilate widely, the pulse becomes imperceptible. The respirations are sighing in character and soon cease. Treatment is as follows:

1. Immediate suspension of operation and tilting the table in steep Trendelenburg position.
2. Immediate rhythmical inflation of the lungs with pure oxygen. With this may be associated the Silvester method of artificial respiration.
3. Procaine intravenously may be useful. There has recently been brought to light definite experimental and clinical evidence regarding the value of intravenous procaine to diminish cardiac irritability. Cardiac arrhythmias produced by epinephrine in dogs under cyclopropane anæsthesia can be prevented and successfully treated by the intravenous use of procaine. It has also been shown that even when ventricular fibrillation has set in, the intracardiac injection of procaine has resulted in a return of sinus rhythm. Burstein recently reported excellent results using 30 to 70 mgm. of procaine intravenously in the treatment of acute cardiac arrhythmias under general anæsthesia. Prompt improvement, using the intravenous route, made intracardiac puncture unnecessary.
4. Cardiac puncture may be attempted. Many think that the mechanical stimulus of this procedure alone is effective. Puncture is performed with a 5″ needle, 20 to 22 gauge, inserted through the third right intercostal space and directed downwards towards the mid-line. The auricle lies at a depth of 2″ in children, and 3½ to 4″ in adults. Various drugs, such as: camphor, coramine, adrenaline, digitalis and strychnine have been injected. The value of these is doubtful. A special needle electrode has been devised in the United States. It imitates the normal sinus rhythm and acts as an artificial pace-maker.
5. If these methods are of no avail, opening the abdomen, separation of the diaphragm from the left costal margin and direct cardiac massage, is indicated. Cases of successful resuscitation by this method are being reported. Direct cardiac massage must be instituted promptly or death from cerebral anoxia may ensue despite successful resuscitation by this method.

The dangers of the possibility of vagal inhibition and ventricular fibrillation will constantly recur in the mind of the careful anæsthetist. His knowledge of the etiological mechanism will make him strive to avoid the following situations. (1) Hasty anæsthesia on the unprepared patient. (2) Allowing surgery to be begun on improperly anæsthetized patients, under any circumstances. (3) Consenting to give pentothal anæsthesia alone for surgical procedures on the neck. (4) The use of adrenaline-soaked plugs or tampons on bleeding surfaces under chloroform or cyclopropane.

Incidental to the above remarks, the potential hazards of the new operation of vagotomy for peptic ulcer must be considered. Vagal inhibition is a real threat here. Blocking the proximal portion of the nerve with novocain to prevent dangerous stimuli is recommended.

SECONDARY CARDIAC FAILURE

Gillies maintains that secondary cardiac failure is the commonest fatal accident in anæsthesia. The essential cause is failure to maintain a free airway. It is, therefore, not unavoidable. This phenomenon occurs in the obstructed patient near the end of the induction period. Violent respiratory efforts occur against resistance. Pulmonary engorgement and over-distension of the right heart occur.

Cardiac depression will occur from anoxia, as well as the effect of anæsthesia.

If this accident should occur, direct oxygenation is, of course, extremely imperative and the best means is direct insufflation through a tracheal catheter, in addition to the above mentioned methods of resuscitation.

SPINAL ANÆSTHESIA

Despite the recent introduction of newer agents and techniques, which assure more readily controlled levels of anæsthesia, accidents still occur with spinal methods. The main sources of trouble are: (1) Undue fall in blood pressure. (2) Respiratory embarrassment or arrest resulting from high anæsthesia. (3) Cardiac depression.

Falling blood pressure.—There has been much controversy as to the value of the routine administration of a vasopressor substance before operation, but the majority of opinion is definitely in its favour. Dripps and Deming, in a recent publication, report results in a series of 2,500 cases, divided into five groups of 500 cases each. They observed a much greater incidence of hypotension in the group which received no preoperative analeptic drugs.

The most effective substances for maintenance of blood pressure are as follows, in order of efficiency: (1) Methedrine (B. & W.) 20/30 mgm. i.m. (2) Ten units pitressin, combined with 50 mgm. of ephedrine i.m. (3) Ephedrine 50 mgm. i.m. (4) Paredrine 10 mgm. i.m.

Our routine has been to administer 50 mgm. of ephedrine with novocaine subcutaneously at the time of infiltration for lumbar puncture. We have found methedrine 20/30 mgm. i.m., to be an excellent drug in the treatment of sudden or severe drops of blood pressure during anæsthesia. The reaction is a moderate increase in blood pressure to optimum levels which are well maintained. Analeptic drugs are seldom required during operation however, if the level of anæsthesia is adequately controlled and proper and frequent use is made of supportive intravenous therapy.

What degree of hypotension during spinal anæsthesia represents an emergency situation? This is not an easy question to answer. In the first place, we know that the effect of spinal anæsthesia in blocking the white rami of the sympathetic chain results in a direct relationship between the anæsthetic level and the degree of hypotension resulting. Spinal anæsthesia to the level of the fourth thoracic segment will always result in a definite drop in blood pressure.

Let us take an average of spinal anæsthesia for cholecystectomy, as an example. Spinal anæsthesia to the fourth thoracic segment is required. There will often be an initial drop in blood pressure to 70 mm. Hg. systolic in these cases, but a compensatory rise will usually occur within the first twenty minutes. The preoperative administration of a vasopressor substance, plus an actively running intravenous, will assist in this. If the patient has a good colour, is warm, and shows no other manifestations of shock, there is not much to worry about. But if the blood pressure, after thirty minutes of difficult operating, begins to decline to 70 mm. Hg. systolic and, coincidentally, signs of shock appear despite supportive therapy, an analeptic will usually be of definite value and will help to prevent an emergency situation. In other words, the initial drop in blood pressure, that accompanies controlled spinal block, is not, in itself, a serious situation. It is the hypotension that is associated with other definite manifestations of deterioration in the patient's condition that requires the use of analeptics and they will help a great deal more in these cases.

Respiratory arrest.—The most difficult emergency situation under spinal anæsthesia is respiratory arrest from high spinal block. It is probably the commonest cause of death in modern anæsthesia. The mechanism is simply an upward spread of the anæsthetic solution in sufficient concentration to paralyze the motor roots of the thoracic nerves, causing an intercostal paralysis, and of the phrenic roots from the second, third and fourth cervical nerves, resulting in cessation of movements of the diaphragm. Respiration ceases and anoxia occurs. Before anoxia affects the circulatory mechanism, however, a marked slowing of the heart results from blocking of the cardiac accelerator fibres originating from the upper five thoracic segments. Following this sequence of events, unless oxygenation is initiated promptly, and maintained, death will quickly ensue from anoxia of the vital centres.

This condition is one of the most outstanding emergencies in anæsthetist can face. Confusion and lack of organized methods will cost the patient his life. Available equipment and orderly,

effective treatment will save him. An anæsthetic machine should be instantly available whenever a spinal anæsthetic is given. Secondly an anæsthetic carriage should be at hand and equipped with all the mechanical equipment, drugs and supplies which the anæsthetist uses. Thirdly, laryngoscopes must be taken apart after use and assembled only for immediate use. This avoids accidentally burnt out batteries.

The emergency routine, in case of respiratory arrest, should be as follows:

1. Warn the staff.
2. Ask the surgeon to commence rhythmical compression of the chest.
3. Prompt inversion of the table into the Trendelenburg position. An exception to this rule is when a hyperbaric solution of pontocaine-glucose has been administered within the last few minutes.
4. Have the assistant start an intravenous of normal saline immediately and inject 8 minims of adrenaline into the tubing near the needle.
5. An artificial airway is inserted into the patient's mouth, the face-piece strapped on tightly, and in coordination with the surgeon rhythmical inflation of the lungs with oxygen is begun by using some manual pressure on the rebreathing bag. If the exchange is satisfactory, carry on. But, if there is evidence of obstruction one must rapidly intubate the patient, preferably using an intratracheal tube with an inflatable cuff. Direct oxygenation of the pulmonary tree is then established. Do not over-compress the bag in haste or it may rupture some pulmonary alveoli. Artificial respiration may be required for 20 minutes or more before automatic breathing is re-established. But if continued efficiently, serious circulatory depression will be avoided.

If the cardiac impulse should disappear, cardiac puncture must be resorted to and 12 to 15 minims of adrenaline injected intracardially. If no immediate response occurs, direct cardiac massage must be immediately instituted. Following resuscitation the question always foremost in one's mind is—what was the period of cerebral anoxia?

Convulsions.—Wilson, in 1926, first described ether convulsions occurring in children. Their etiology is not definitely understood but it seems reasonable that anoxia is an important factor. Young children have high metabolic rates, particularly if sepsis is present. The result is a direct increase in oxygen requirements. Atropine is also a metabolic stimulant and increases oxyen demands. Carbon dioxide imbalance and calcium deficiency must also be considered. Convulsions may also occur where local or regional anæsthesia is being used. It may be caused by drug sensitivity, low tolerance, over-dosage, or accidental intravenous injection. Over-dosage is the commonest cause. One should never give these substances without being conversant with the safe dosage ranges and keeping careful check on the amount being given in each case.

Treatment of a convulsive episode consists in controlling the violent movements with 4 to 8 c.c. of 2.5% pentothal, intravenously; 1% pentothal should be adequate and is more readily controlled in children. Immediate oxygenation is important.

PENTOTHAL ANÆSTHESIA

Serious emergencies occurring when pentothal is administered are uncommon now. Some occurred during the war years when the drug was new; men had less experience and under service conditions adequate resuscitation apparatus was sometimes not available. The drug is a respiratory depressant and prolonged apnœa can and does occur. However, this condition does not unduly concern the administrator who has an efficient machine handy and can immediately initiate controlled respirations by periodic manual compression of the breathing-bag filled with oxygen. Undue depression can be prevented by proper selection of cases and by restricting the use of the drug to shorter, less painful procedures, where doses of 1 gram or less can be used.

Pentothal is of great value in the induction of anæsthesia. It may be combined with N_2O oxygen and cyclopropane and oxygen. These combinations prevent the necessity of depressant doses of pentothal. Depression is usually promptly treated by giving coramine 5 c.c. intravenously and oxygen.

One serious accident can occur with pentothal and that is intra-arterial injection. This has occurred in the case of a superficial, aberrant ulnar artery in the cubital fossa. If an artery is entered there is an immediate forcefully pulsating jet of cherry-coloured blood into the syringe with sufficient force to push the plunger outwards quickly. This can always be identified if once seen. The result of intra-arterial injection results in an immediate excruciating pain in the hand because of the immediate vasoconstriction. The hand will blanch for a few minutes and then becomes warm and pink from compensatory vasodilation. The pain will then disappear. Large amounts, however, can cause persistent vasoconstriction resulting in a thrombo-angiitis and a profound ischæmia. Amputation may be necessary.

Immediate treatment in these cases is to perform a stellate ganglion or brachial block on the affected side, using 30 c.c. of 2% novocaine. The idea is to break the sympathetic axone reflex and prevent the prolonged vasoconstriction.

CURARE

This is an excellent agent and of great value. Very few accidents have been reported with its use but we have had a few worries. The danger seems to be in transferring a patient with respiration embarrassed by curare, from the high oxygen-containing mixtures of the anæsthetic machine to atmospheric oxygen concentration of only 21%. These patients also have some degree of drug depression from anæsthesia. One or two patients were cyanosed, spastic and had transient jactitations which were explained as being due to a transient cerebral anoxæmia resulting from respiratory embarrassment from residual curare effect.

The following precautions should be taken:

1. Watch the time of administration of the last dose of curare. Watch for residual effects if anæsthesia is discontinued in less than thirty minutes after administration of the last dose.
2. Always inspect respiratory excursions and colour before the patient leaves the theatre.
3. If any sign of embarrassment persists, administer oxygen with a B.L.B. mask for at least 20 minutes.
4. Give prostigmine 5 mgm. intramuscularly.

CONCLUSION

The maintenance of the system of oxygen transport, under all circumstances, is the secret of satisfactory safe anæsthesia. Newer agents and methods are stimulating and helpful, but they will always be of secondary importance to the experience and watchful diligence of the administrator.

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RÉSUMÉ

Les principales circonstances pouvant constituer des alertes sérieuses au cours de l'anesthésie sont passées en revue et discutées. Les principales causes d'alerte sont les vomissements, l'anoxémie, le laryngospasme et la défaillance cardiaque. Certaines complications dûes à la rachianesthésie, à l'anesthésie au pentothal et au curare sont présentées et analysées. En somme, il s'agit avant tout de maintenir pendant toute anesthésie un apport suffisant d'oxygène. JEAN SAUCIER

INFLUENZAL MENINGITIS*

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AN analysis of 13 consecutive cases of influenzal meningitis is presented in this paper. Twelve were treated at the War Memorial Children's Hospital, London, and one at a nearby hospital during the past few years. This disease is confined almost entirely to infancy and early childhood: 75 to 80% of all patients are under two years of age. Twelve of this series were under four years and one was an eight-year old girl. It is similar clinically to the other forms of acute purulent meningitis. Not infrequently signs of an upper respiratory infection have been present for a few days. The infection is nearly always due to type *B. hæmophilus influenzæ*. Seven of the patients made a complete recovery. Four of the six patients who died were under eight months of age and three died within 24 hours of admission to the hospital.

With all acute infections, an early diagnosis is important in order that proper and adequate treatment be given at once. If, however, adequate treatment has been delayed, even for some weeks, the outlook is not always hopeless. This is well illustrated in two of the patients who had inadequate treatment over a period of some weeks previous to admission to the hospital. They both made a complete recovery following the institution of what is accepted at the present time as effective therapy.

The treatment given these patients was as follows: As soon as the spinal fluid was withdrawn and shown to contain many polymorpho-

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nuclear cells they were at once given one of the sulfonamides 3 to 4 gr. per pound of body weight each 24 hours. This amount was divided into six equal doses and administered every four hours either orally, or intramuscularly or intravenously. Sodium bicarbonate in sufficient dosage was also given along with the sulfonamide. There was next a complete examination of the spinal fluid and if on direct smear, Gram-negative bacilli with morphology characteristic of the influenza bacillus found, a continuous intravenous was started using 5% glucose in normal saline. With one patient the organism was not found on direct smear but was reported to be present when the spinal fluid was cultured. Here there was a delay of 15 hours before the intravenous administration of fluids and serum, but during this time there was the inhibiting effect of the sulfonamide upon the organism causing the infection.

The amount of glucose in the spinal fluid is conceded by many as a fairly reliable guide to the severity of the infection. We therefore adopted the standards for gauging the initial dose of antibody as advised by Alexander.[1]

Spinal fluid sugar mgm. per 100 c.c.	*Antibody nitrogen indicated mgm.*
under 15	100
15 to 25	75
25 to 40	50
over 40	25

As soon as we received the estimation of spinal fluid sugar, the amount of antibody nitrogen required was determined and given in one dose with the fluid of the continuous intravenous, thus attempting to establish antibody in excess in the blood stream. Blood transfusions were given to some of these patients when indicated, in addition to the sulfatherapy, the serotherapy and fluids intravenously.

The youngest patient in this series was a seven weeks' old infant who was admitted to the hospital in a moribund condition and died a few hours after admission. The spinal fluid was turbid. On direct smear Gram-negative bacilli were found and when the spinal fluid was cultured a pure growth of *H. influenzæ* was obtained. The patient had a purulent discharge from the left ear which on culture was found to be due to the same organism. At the post-mortem examination, pus was found in the left mastoid. This was cultured as was also the blood and a pure growth of *H. influenzæ* was obtained from both. This infant had been ill for only two days previous to admission with signs of a slight upper respiratory infection.

Three other fatal cases were under eight months of age; another was two years of age. Convulsions, cyanotic attacks, drowsiness, vomiting and high fever were the common symptoms. These had been present for a period of two to three days previous to admission to the hospital. Not all had neck rigidity.

The other fatal case was a four-year old girl who was seen in a neighbouring hospital when signs of meningitis had developed. There were certain features in her clinical history that were of unusual interest. She died twelve hours after the combined therapy of soludagenan and type specific antibody serum had been given intravenously. The history obtained was as follows: This girl's illness started suddenly six days previously with signs of acute laryngitis (croup). As the obstruction element rapidly became worse, she was admitted to the hospital the same day and a tracheotomy done. Due to the great urgency at this time, cultures from the trachea were not taken. She was given penicillin 15,000 units every 3 hours and a 5% glucose solution intravenously. Three days after admission this patient passed some blood by bowel and from that time on, blood was present in the stools. A few petechiæ and purpuric spots appeared. Unfortunately a blood culture had not been taken. Without the bacteriological report in this case, it was impossible to say but it was probable that this patient's original infection, the acute laryngitis, was due to *H. influenzæ*. Occasionally a most virulent form of croup is due to this organism. The intestinal hæmorrhage and the appearance of the purpuric spots point strongly to a blood stream infection and finally the meningitis which definitely was due to *H. influenzæ*.

Five of the patients who recovered ran a fairly similar course. When the diagnosis was established each received in addition to the sulfonamide, usually sulfadiazine, the required amount of antibody as indicated by the percentage of sugar in the cerebro-spinal fluid. The continuous intravenous injection was continued until the patients could take large quantities of fluid by mouth without vomiting. These patients require extra fluids when taking large doses of sulfadiazine and in addition they are usually somewhat dehydrated when admitted to the hospital. A lumbar puncture was done each day and with all five patients the spinal fluid was reported sterile within 48 hours of the commencement of treatment and all subsequent specimens of spinal fluid were also reported sterile on culture. These patients also showed marked improvement clinically by the third or fourth day, hence we reduced gradually the dose of sulfadiazine. The average number of days in the hospital was 21. These patients appeared normal when discharged and four of the five have been examined since their recovery and were normal mentally and physically. The parents of the fifth patient reported their child was in good health and in their opinion normal.

The history of the eight-year old girl in this series was of unusual interest. Seven weeks previous to admission to the War Memorial Children's Hospital, she had been admitted to hospital in a neighbouring city

where a diagnosis of meningococcic meningitis was made. For the first sixteen days she received sulfapyridine one grain per pound of body weight each 24 hours. This was divided into six equal doses and given every four hours. She appeared much improved clinically by this time, so the sulfapyridine was discontinued for three days and then she was discharged to her home. Three days later she was readmitted to the same hospital with a recurrence of the original symptoms. The dosage of the sulfapyridine was now increased to grains 2½ per pound of body weight in the 24 hours for the next three or four days. The sulfa-blood level at this time was reported as 13.1 mgm. %. The dosage of sulfapyridine was gradually decreased to 1 grain per pound of body weight and this amount she received until the date of admission to the War Memorial Children's Hospital. This child had received sulfapyridine 1 to 2½ grains per pound of body weight each 24 hours for a period of seven weeks, with the exception of six days when she showed improvement clinically and the drug had been discontinued.

On admission to the hospital, her urinary output was satisfactory. The laboratory reported her urine as normal and no sulfa crystals were seen. She had a moderate degree of anæmia; hæmoglobin 64%, red blood cells 3,800,000, white blood cells 12,000, neutrophils 72%, and lymphocytes 27%. Her spinal fluid was faintly turbid and on direct smear a few Gram-negative bacilli were seen. The culture of her spinal fluid showed a pure growth of *H. influenzæ*. The cerebro-spinal fluid sugar was 50 mgm. %.

A 5% glucose solution was given to this patient by means of a "continuous intravenous" and into this was introduced 50 mgm. of anti-hæmophilus influenzæ type B serum (rabbit). She received no sulfatherapy during the first six days in the hospital. The spinal fluid withdrawn 24 hours later was reported as sterile on culture as was each subsequent specimen of spinal fluid submitted to the laboratory. This girl made a complete recovery and was discharged from the hospital thirteen days after admission. She has been examined on a number of occasions during the past two and a half years and appeared normal both mentally and physically and was doing well at school.

Another of our patients, C.R., a fifteen-months old male infant failed to respond to what would be regarded as adequate sulfatherapy alone, but responded quickly following the administration intravenously of anti-hæmophilus influenzæ type B. Serum. This infant's history was as follows:

Three weeks previous to admission to the War Memorial Children's Hospital, he was admitted to a hospital in a neighbouring city where a diagnosis of influenzal meningitis was made. He was given sulfadiazine 40 gr. every four hours for the first four doses, then 20 gr. every four hours until two days before he arrived at the Children's Hospital. The drug was discontinued because the patient developed what appeared to be a sulfa rash. This patient weighed 20 pounds and he had been receiving 120 gr. of sulfadiazine each day, or 6 gr. per pound of body weight each 24 hours. During this three weeks of intensive sulfatherapy, there were a few days when he appeared clinically improved but repeated cultures of spinal fluid during this period of time showed a growth of *H. influenzæ*.

On admission to the Children's Hospital his urinary output was considered adequate. The laboratory reported his urine as normal and no sulfa crystals were seen. His blood examination was as follows: hæmoglobin 52%, red blood cells 3,600,000, white blood cells 8,400, neutrophils 36%, lymphocytes 62% and monocytes 2%.

His spinal fluid was examined and on direct smear a few Gram-negative bacilli were found and on culture a pure growth of *H. influenzæ* was obtained. The cerebro-spinal fluid sugar was 10 mgm. %.

This infant was given intravenously 600 c.c. of a 5% glucose solution in the first four hours and with this 100 mgm. of anti-hæmophilus influenzæ type B. serum which he received in the first two hours. The sulfadiazine, which had been discontinued two days previously, was again given 4 gr. per pound of body weight each 24 hours. This was reduced by one-half five days later as each daily specimen of spinal fluid submitted to the laboratory was reported sterile on culture. Three days later it was again reduced by one-half and in a further period of three days discontinued entirely.

This patient was given a blood transfusion shortly after admission. He made a complete recovery and was discharged on the sixteenth day.

DISCUSSION

It is conceded that the best results in the treatment of meningitis due to *H. influenzæ* are obtained by the use of one of the sulfonamides with type-specific anti-serum. With this treatment, the fatality rate has been lowered from 95 to 50%, and in one series to 22%, even though we have as yet no method of determining the virulence of the bacilli causing the infection and no tests to determine accurately the amount of sulfonamide and anti-serum we should use. The disease still remains a most serious one, with a high mortality rate in the early months of life, even if treatment is started early in the course of the infection.

Recoveries from this disease have been reported by the use of one of the sulfonamides alone. Alexander believes that "the capacity of sulfonamides to effect complete recovery from type B. influenzal infection is influenced by two factors. First, the infection must be relatively mild. Second, the drug must be started early in the course of the infection. It is believed that only under such conditions will sufficient time be afforded to the patient to produce, through his own powers, sufficient antibodies to overcome the disease." Our 15-months old patient, C.R., had adequate sulfatherapy over a period of three weeks and treatment was started early following the onset of symptoms, yet his spinal fluid following the three weeks of intensive sulfatherapy contained many organisms. Was this a case of a virulent infection?

The possibility of sequelæ in this infection, mental retardation, deafness, hydrocephalus, etc., is of great importance. It is thought they are more likely to be seen in the chronic form, in those who have been inadequately treated over a period of many weeks. Our 8-year old patient A.P., who had seven weeks of inadequate therapy previous to admission to the War Memorial Children's Hospital, responded quickly when given the type specific anti-

serum intravenously. Two and a half years after her illness she was normal both mentally and physically.

The prognosis, both as to life and the possibility of any sequalæ is not necessarily unfavourable because there has been long delay in instituting adequate therapy.

SUMMARY

1. Influenzal meningitis will continue to have a high mortality rate during the early months of life, until a more effective treatment has been discovered.

2. In view of the high mortality rate in all patients with this disease until a few years ago it is advisable that every patient should be given both sulfatherapy and serotherapy as soon as a diagnosis has been made.

3. An early diagnosis and the prompt administration of adequate treatment is of great importance. However, complete recovery does take place sometimes when there has been a delay of weeks before adequate therapy has been given.

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RÉSUMÉ

La méningite à *H. influenzæ* demeure toujours très meurtrière lorsqu'elle survient durant les premiers mois de la vie, du moins, lorsqu'elle est traitée par les moyens en usage à la date de parution de ce rapport (juin 1946). Il s'agit de donner au malade une quantité suffisante de sulfamidés et d'y adjoindre, selon l'indication, la sérothérapie spécifique à la dose convenable. On n'oubliera jamais d'associer le sérum glucosé à 5% dans tous les cas, comme médication adjuvante de soutien. Le diagnostic précoce est de première importance, cependant, un certain délai n'est pas incompatible avec la guérison. JEAN SAUCIER

The leech should always be busy about things belonging to his craft. He must always be talking about it or studying it or be writing or praying, for the use of books brings a doctor a good reputation because it is both noticed by others and he himself becomes wiser thereby. And besides all this it is profitable to him that he be found always sober, for drunkenness destroys all virtue and brings it to naught, as sayeth a wise man, "Drunkenness destroys whatsoever wisdom teaches". Let him be content in strange places with the meats and drinks found there, using moderation in everything. For the wise man says "As it is good to be moderate in everything that is, so without moderation everything that is perisheth".—Master John of Arderne.

INFECTIOUS MONONUCLEOSIS—COMPLICATIONS*

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INFECTIOUS mononucleosis is world-wide in its prevalence. It usually attacks children and young adults. Ordinarily it is not difficult of recognition, and complications are stated by many writers to be exceptional. This paper is concerned with some of the problems in diagnosis and with certain complications.

Serial blood counts and heterophile antibody agglutination tests may be necessary to establish the diagnosis. Absorption tests will eliminate false-positive Paul-Bunnell reactions, a particularly useful procedure if horse serum has been administered previously to the patient. The typical cell of infectious mononucleosis is a large abnormal lymphocyte, often with an indented nucleus, and a pale-staining zone in the cytoplasm immediately about the nucleus. Vacuoles are commonly seen in the cytoplasm which may show projecting processes. All variations between this cell and a normal lymphocyte may be seen. Characteristic changes in the blood and the appearance of enlarged lymph glands may be delayed for as long as several weeks after the onset of symptoms.

The Wassermann reaction in the blood may be transiently positive in a small proportion of cases. Should this occur in a patient with generalized lymphadenopathy and a macular or maculo-papular type of eruption, admittedly an uncommon combination in infectious mononucleosis, confusion with secondary syphilis may take place, unless the blood smear be carefully studied, and the heterophile agglutination test be performed. German measles, with its posterior cervical adenitis, transient rash, and lymphocytosis, likewise may cause difficulty in diagnosis. Scarlatiniform, nodular, vesicular, urticarial, hæmorrhagic, and polymorphous eruptions have been recorded. In 1920, two cases were admitted to a London (England) fever hospital with a presumptive diagnosis of typhus that subsequently proved to be infectious mononucleosis. Acute leukæmia at its onset may constitute a very real difficulty in

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differential diagnosis, but the leucocytosis is usually far in excess of that of glandular fever and the cell type more uniform. Hæmorrhages into the mucous membranes and skin are nearly always present in acute leukæmia. Anæmia is progressive, and the issue fatal. The heterophile agglutination test is negative.

During the course of infectious mononucleosis many subclinical cases occur, as has been amply demonstrated by studies on the blood. Convalescence may be very protracted, and relapses are not uncommon. Asthenia is often marked. The abnormal blood picture and enlarged glands may persist for weeks or months. Eosinophilia is frequently encountered during the convalescent period, commonly constituting about 5% of the differential count, and occasionally attaining values as high as 15 to 20%.

Evidence of possible effects of infectious mononucleosis on the heart is extremely scant. Bradshaw, in 1931, reported the case of a young girl of 17, who was felt to have a normal heart previously, and six weeks after recovery from an attack of mononucleosis was found to have definite clinical evidence of mitral stenosis. Surely, in view of our present knowledge of the pathogenesis of rheumatic endocarditis, no one would seriously entertain the thought that such a mitral lesion was a result of the glandular fever. In their report of an extensive epidemic in an American army post, Wechsler, Rosenblum and Sills record the unexpected discovery of a markedly prolonged P-R interval in an otherwise typical case. They carried out electrocardiographic studies on over 200 patients in their series and found significant abnormalities (abnormal T waves, prolonged P-R interval, or both) in 23%. In some of these the electrocardiograms were known to be normal before the infectious mononucleosis developed. In most, the abnormalities were of short duration, in others, they were persistent for months. No specific change was encountered. It is possible that in certain of their cases infectious mononucleosis was complicating rheumatic fever. In the two fatal cases that I shall presently describe no gross pathological changes were present in the heart, but microscopically, small accumulations of mononucleosis cells were found in the heart muscle and just under the endocardium.

Though cough was a common symptom, pulmonary findings were present in only 30 of the 556 cases reported by Wechsler and his co-workers. They took the form of diffusely scattered rhonchi and fine râles. X-ray studies showed mottling indistinguishable from that seen in so-called atypical pneumonia. These lesions rapidly cleared. In none of their cases could enlarged mediastinal glands be demonstrated in the films. This is similar to my own experience. It is impossible to state whether the acute bronchitis or pneumonia is a part of the disease itself or a complication due to secondary invaders. Increased heterophile antibodies have been reported in cases of atypical pneumonia, unaccompanied by mononucleosis or abnormal lymphocytes in the blood smear.

The incidence of renal involvement varies greatly in the literature. In 65 cases Bernstein found no evidence of this complication. Tidy and Morley reported an incidence of 6% in their 270 cases. In Wechsler's series 3% had abnormal urinary findings. Albuminuria, red blood cells, occasionally macroscopic hæmaturia, and hyaline and granular casts, have been reported. They occurred either at the onset or within the first few days of the illness, and were of short duration, usually disappearing within seven to ten days. Œdema, elevation of blood pressure, nitrogen retention, and other evidence of impaired renal function have not been recorded. Tubular degeneration and interstitial infiltration with mononuclear cells were present in the kidneys of both of my two patients dying from splenic rupture.

The liver may be palpably enlarged in the absence of clinical jaundice. When the latter is present the liver is nearly always definitely enlarged and tender. Latent jaundice is not uncommon. Glandular enlargement may precede or appear simultaneously with the icterus, or follow it after an interval. The clinical picture is very like that of the ordinary case of infectious hepatitis, and, as in the latter, the depth of jaundice may be very variable. Both the clinical features and liver function tests indicate that the jaundice of infectious mononucleosis is due to a diffuse hepatitis, and not secondary to obstruction by enlarged lymph nodes, as has been suggested by several authors. Support for this statement comes from liver biopsy performed on cases of infectious mononucleosis and from autopsy studies on fatal cases. In these, degenerative changes in the liver cells, and marked foci of mononucleosis

cells were seen in the liver sinusoids and portal areas.

The spleen would appear to be palpably enlarged in about one-third of the cases. It may be difficult to feel, and must be persistently sought for by repeated careful examination. Spontaneous rupture of the spleen is of most unusual occurrence. Up to the present there have been ten instances of this complication of infectious mononucleosis reported. Seven occurred in the American army, one in the British, and two, which I should like to describe briefly, on my own wards in a Canadian Army Hospital. These two cases have been reported before the Annual Meeting of the American Association of Pathologists and Bacteriologists, in March 1946, by Dr. J. H. Fisher of London. The abstract of this paper appears in the May, 1946, number of the *American Journal of Pathology*. Both occurred in young Canadians (aged 21 and 24) who were suffering from typical examples of the anginose form of the disease. Rupture took place towards the end of the second week in each instance. It was heralded by steady epigastric pain which preceded collapse by about an hour. The abdomen was uniformly soft on palpation in the first case, and showed slight resistance in the epigastrium and left hypochondrium in the other. The first patient died within a very few minutes of the time I first saw him. A tentative diagnosis of ruptured spleen was made in the second but he died on the operating table, despite energetic measures at resuscitation, before his abdomen was opened.

Autopsy was carried out on both cases. The essential features were as follows: (1) Marked enlargement of the superficial lymph nodes which were soft, grey, moist and succulent in one case, and soft and purplish-red in the other. The mediastinal, para-aortic, mesenteric, and other internal lymph glands were similarly involved. (2) The spleens were both enlarged, one weighing 400 grams and the other 660 grams. The capsules in both had been stripped almost entirely from the underlying pulp, the region about the hilum being the only place where this did not occur. The mechanism would appear to be subcapsular hæmorrhage, which gradually separated the capsule from the pulp, ballooned it up to the point where it burst, so giving rise to massive intraperitoneal hæmorrhage. The splenic pulp was soft, red in one case and greyish-red in the other. (3) The livers weighed 1,700 and 1,900 grams and were soft in consistency. Cut surface showed a pale yellowish-grey mottled appearance with the usual markings rather indistinct. (4) The kidneys were slightly swollen and cut section revealed the appearance of cloudy swelling. (5) The bone marrow appeared to be grossly normal. (6) The main microscopic features were prominent accumulations of mononucleosis cells in most of the viscera, but especially in liver, spleen, lymph-nodes and kidneys. The bone marrow showed no specific changes.

The final complication of infectious mononucleosis to which I wish to refer is involvement of the central nervous system. This may take the form of meningitis, encephalitis, or both. The neurological symptoms and signs may dominate the clinical picture at the onset, to be followed by glandular enlargement, splenomegaly and changes in the blood, or the reverse may be encountered. Pain in the back of the neck is not uncommon in cases with marked posterior cervical glandular involvement, and at times it is accompanied by voluntary rigidity, which simulates that seen in meningitis. It has been reported that clinical signs of serous meningitis may be present with normal spinal fluid findings, and, conversely, that abnormal spinal fluids may be encountered when clinical signs of meningitis are lacking. In one of Wechsler's cases in which severe frontal headache, vomiting, and moderate neck rigidity were present, the initial examination of the spinal fluid revealed 524 white blood cells, 517 of which were lymphocytes, total protein 284 mgm. %, colloidal gold and Wassermann reactions negative. Repeated lumbar punctures were carried out because of recurrent headache, the ninth and final tap being performed 51 days after the first. At this time there were still 64 cells present, 63 of which were lymphocytes, and the total protein was 34.6 mgm. %. In most of the reported cases, the increase in cells has been much less marked: 12, 16, 28, 34, etc., in association with a slight increase in total protein. Nearly all of these cases made a good clinical recovery in about a month. So far I have not encountered any record of chronic neurological sequelæ, but Thomsen and Vimtrup have reported six cases in which death occurred from respiratory paralysis during the acute phase of the disease.

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RÉSUMÉ

La mononucléose infectieuse, affection relativement fréquente, peut se confondre avec la syphilis secondaire, la rubéole, le typhus et la leucémie aigue. L'étude de la formule sanguine tranche habituellement la question. Cette maladie se complique parfois de cardiopathie, de bronchite, d'albuminurie, d'hématurie, de troubles hépatiques et spléniques. Deux cas mortels d'hémorrhagie de la rate sont rapportés. Parfois, les centres nerveux sont touchés et le tableau rappelle alors celui d'une méningo-encéphalite. On devra rechercher toutes les fois que cette affection est soupçonnée les modifications caractéristiques des mononucléaires.

JEAN SAUCIER

HÆMOGLOBIN LEVELS IN CANADIAN POPULATION GROUPS: CHILDREN AND YOUNG WOMEN*

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THE determination of hæmoglobin has been used frequently in nutrition surveys to provide an indication of adequacy of iron intake. Data are often difficult to interpret for three principal reasons: (1) determinations of hæmoglobin are often made by inaccurate procedures, as by using Sahli or Dare hæmoglobinometers; (2) results are expressed frequently as percentages of some standard which is usually not defined; and (3) there is little agreement as to "normal" values. Because of this last difficulty particularly we are reporting hæmoglobin values obtained in three nutrition studies, covering two groups of elementary school children and a group of university women students.

Several recent reports have provided hæmoglobin values for groups comparable to those discussed here. The Medical Research Council of Great Britain has stated[1] that children, 6 to 13 years, in Great Britain had average levels of 12.4 to 12.7 gm. % (recalculated from the published data which were given in terms of a standard of 13.8 gm.). Macy[2] has reported hæmoglobin levels of 11 to 13 gm. % for eight children who had been maintained on a "completely adequate" diet for eight months. The adequacy of the diet should be questioned since values for five other children, who were said to be from indigent families and who were reportedly suffering from malnutrition, were 13 to 16 gm. %. For girls of 15 to 19, who may be compared with younger university students, the Medical Research Council[1] gave an average value of 13.6 gm. %. Ohlson *et al.*[3] studied hæmoglobin levels in 4,550 college women in the north central United States and found a range of 8.5 to 17.5 gm. %, with an average of 13.4. For 864 women students at McGill University, Pedley[4] reported a range of 10.1 to over 15.6 and the highest value was not stated; 77% of the McGill group had values between 12.4 and 14.7 gm. %.

METHOD

Hæmoglobin was determined in 0.02 ml. of finger-tip blood by the cyanmethæmoglobin procedure described by Collier.[5] If the blood is delivered carefully into water from a previously dry clean pipette, the errors in that part of the method can be minimized. Ten 0.02 ml. quantities taken with the same pipette from a sample of oxalated human venous blood showed a 2% variation in hæmoglobin content. A 3.4% variation was found in values for nine determinations on fully flowing blood from a finger-tip puncture. Great care was exercised in taking and measuring the blood samples and we are of the opinion that precision, greater than that stated above, cannot be attained on a routine basis.

It has been our practice in some cases to store diluted bloods in a refrigerator for periods up to four days before determining hæmoglobin. This was justified by experiments conducted by Mrs. Semmons of these laboratories. Portions of the same sample of blood diluted 1:500 were stored, some at room and some at refrigerator temperature, some with and some without the addition of 2 drops of toluene per 10 ml. The hæmoglobin value for refrigerated diluted blood without toluene remained the same for 4 days. Samples stored at room temperature without toluene increased slightly but were only 4% higher on the fourth day. After 4 days values rose for blood stored without toluene at either temperature. The presence of toluene at either temperature appeared to cause increased values within 4 days.

Diurnal variation has been said to be a factor of consequence in hæmoglobin determinations. We have examined this to a limited extent. Seven human subjects were used, four of whom provided samples on two different days. To minimize experimental error, 2.0 ml. of venous blood were used and determinations were done in duplicate. Depending upon the individual, a variation of 1.5 to 9.3% was shown between 9 a.m. and 5 p.m. A typical picture was an increase of 4 to 5% between 9 a.m. and noon, followed by a slight fall in the afternoon. The variation encountered in duplicate samples from 2.0 ml. of the same blood was 1.3 to 1.5%. Mole[6] has examined the data of McCarthy and

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Van Slyke[7] on diurnal variations, using the method of variance analysis. He reported the appearance of a significant fall of about 4% between 9 a.m. and 11 p.m., which did not occur, however, until after 5 p.m. We have concluded that the small extent of diurnal variation makes the time of day an insignificant factor in taking blood samples for hæmoglobin estimation in nutrition surveys.

DESCRIPTION OF SUBJECTS

Hæmoglobin values for three groups of subjects are presented below. Group A consisted of 200 children from two urban primary schools, with an age range from 5 to 15 years. Half of these children had been reported previously to be undernourished; their chief defect was underweight. The other half was regarded as being in a satisfactory condition. Since no significant difference in hæmoglobin levels or in iron intakes was found between the two sets, the results have been considered together; 28% of all these children were receiving supplies of iron which were inadequate according to comparison with current standards. The chief nutritional defects found in this group of children were under weight, poor muscle tone, and mild thyroid enlargement.

Group B was composed of 518 unselected children, almost the entire attendance of one urban primary school. Their nutritional status was comparable to that of Group A with minor differences and the hæmoglobin values were markedly similar.

Group C consisted of 1,080 younger university students whose hæmoglobin levels were measured shortly after the opening of the fall term; 135 of these girls, living in residence, had a second determination six months later. Their average iron intake, estimated from a brief questionnaire and from a study of the residence menus, was 13 mgm. per day. Of this group who were re-examined, 15% had taken supplementary iron during the six-month period.

HÆMOGLOBIN VALUES

Table I gives the distribution of hæmoglobin values for group A and Table II for group B. Since the range of hæmoglobin values was found to be comparable in both groups, the results have been combined to prepare a statement of age and sex distribution in Table III. In preparing this table, values for ages 5, 15 and 16 were omitted because there were less than 10 subjects in each of these age groups.

TABLE I.

HÆMOGLOBIN VALUES IN GROUP A CHILDREN

Hæmoglobin range grams-%	*Number of persons*	*% of group*
10.1 - 11.0	10	5
11.1 - 12.0	46	23
12.1 - 13.0	90	45
13.1 - 14.0	42	21
14.1 - 15.0	12	6
15.1 - 16.0	1	

TABLE II.

HÆMOGLOBIN VALUES IN GROUP B CHILDREN

Hæmoglobin range grams-%	*Number of persons*	*% of group*
8.1 - 9.0	4	
9.1 - 10.0	8	
10.1 - 11.0	49	10
11.1 - 12.0	113	22
12.1 - 13.0	182	35
13.1 - 14.0	119	23
14.1 - 15.0	33	6
15.1 - 16.0	8	
16.1 - 17.0	1	

Table IV shows hæmoglobin values obtained for university women in the fall of 1945. Age distribution of hæmoglobin levels is given in Table V. In the preparation of this table,

TABLE III.

AGE AND SEX DISTRIBUTION OF HÆMOGLOBIN VALUES IN CHILDREN

	Boys			*Girls*		
		Hæmoglobin, grams-%			*Hæmoglobin, grams-%*	
Age	*No. in group*	*Range*	*Average*	*No. in group*	*Range*	*Average*
6	10	9.5 - 13.1	11.1	23	8.8 - 13.5	11.4
7	38	9.7 - 14.7	11.8	36	8.7 - 13.3	11.3
8	37	10.6 - 14.7	12.1	29	9.0 - 12.7	11.3
9	40	10.8 - 13.5	12.0	36	10.6 - 14.1	12.1
10	40	9.9 - 15.0	12.5	41	10.9 - 16.2	12.8
11	44	10.1 - 15.7	12.5	56	10.4 - 14.7	12.4
12	35	10.2 - 14.4	12.9	50	10.4 - 15.9	12.6
13	31	11.2 - 14.7	13.0	33	10.4 - 15.0	12.2
14	16	11.5 - 15.9	13.4	25	10.4 - 14.1	12.7

several age groups have been omitted because of the small number of persons.

TABLE IV.

HÆMOGLOBIN VALUES IN UNIVERSITY WOMEN, AUTUMN, 1945

Hæmoglobin range grams-%	*Number of persons*	*% of group*
7.1 - 8.0.....	10	1
8.1 - 9.0.....	14	1
9.1 - 10.0.....	71	7
10.1 - 11.0.....	152	14
11.1 - 12.0.....	218	20
12.1 - 13.0.....	363	34
13.1 - 14.0.....	195	18
14.1 - 15.0.....	46	4
15.1 - 16.0.....	10	1
16.1 - 17.0.....	1	

TABLE V.

AGE DISTRIBUTION OF HÆMOGLOBIN VALUES IN UNIVERSITY WOMEN

Age	*No. in group*	*Hæmoglobin, grams-%*	
		Range	*Average*
17	111	7.2 - 14.8	12.2
18	310	7.2 - 15.0	12.0
19	196	7.2 - 15.8	12.1
20	75	7.7 - 15.2	11.9
21	64	7.7 - 16.1	11.7

It has been noted above that hæmoglobin estimations were done on 135 women students in the fall and in the succeeding spring. Distribution of values for the two periods are shown in Fig. 1.

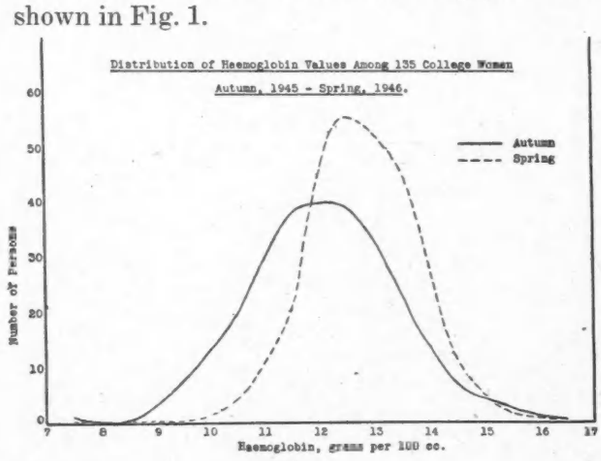

Fig. 1

DISCUSSION

To facilitate comparison of data in this paper with those given in the literature, a summary in Table VI shows the ranges and averages for the three groups of subjects. As has been mentioned above, the ranges and averages for the two groups of children are similar. Moreover, these are similar to those reported for British children[1] and for the few United States children described by Macy.[2] The values for Toronto women students are lower than those given by Ohlson *et al.*,[3] by Pedley,[4] and for a comparable British group.[1] The hæmoglobin values of the 135 women examined by us in the spring of 1945 lie within the same range as was found by Pedley.

TABLE VI.

AVERAGES AND RANGES OF HÆMOGLOBIN VALUES

Description of persons	*Number of persons*	*Hæmoglobin, grams per 100 c.c.*		
		Range	*Arithmetic mean*	*Standard deviation*
Group A children..	200	10.1 - 15.2	12.5	0.96
Group B children..	518	9.0 - 16.1	12.4	1.23
University women.	1,080	7.2 - 16.1	12.0	1.42

The data given in Table III indicate that the level of hæmoglobin in children increases from age 6 to age 14, the increase being greater for boys than for girls. This observation could also be secured from the data recently reported by MacKay, Wills and Bingham.[5] The values for girls in Table III may be considered jointly with those given in Table V. Apparently, girls show a slight increase from age 6 to age 14 and a slight, perhaps negligible, decrease from age 17 to 21.

In assessing data from nutrition surveys it is desirable to determine the number of subjects with subnormal hæmoglobin values as a possible indication of iron deficiency. It is realized that the amount of iron deficiency cannot be determined from such evidence alone and that other factors may influence hæmoglobin formation. Moreover, there is little agreement as to normal values. The use of an average value, even if there was sound evidence regarding normal averages, would be misleading if applied to individuals because of variations from one person to another. It is unlikely that all individuals, even of the same age and sex and with the same iron intake, would have the same level of hæmoglobin. In nutrition surveys the desired information is the deviation from the optimum. The optimal individual or average value may be quite different from the normal unless it is certain that the persons used as subjects are in an optimal state. That information is not available for the subjects in the present study, or in any other so far as we are aware. The

lowest values in the groups here reported were probably indicative of anæmia. This certainly appeared to be true in the case of the university women. In the sub-group of 135 who were studied in the fall and in the subsequent spring there was a shift in the range of hæmoglobin levels and an increase of 0.8 gm. in the average. The principal change appeared to be a disappearance of low values, likely due to an increased supply of nutrients needed for hæmoglobin formation during the intervening six months. Those girls who took supplementary iron in the period between observations showed an average increase of 0.9 gm. %. The absence of change in those having values above 13 gm. % might indicate that this level is a normal one for young women. There is not sufficient evidence for this conclusion.

The similarity of the average value found for children in this study with averages previously reported would encourage us to conclude that the value was normal. The variation with age and sex should be recalled in interpreting average values for children and in the use of an average to assess survey results.

Measurement of hæmoglobin is generally regarded as so simple that little attention is paid to it. Results are frequently open to question. Determinations made with Dare or Sahli hæmoglobinometers are simple but not fool-proof. The procedure used in the present study is reasonably simple and rapid. Other recent methods are also available which provide the same advantages. It would seem that more attention should be given to hæmoglobin estimations and that attempts should be made, at least in hospital and in diagnostic laboratories, to provide accurate and dependable results.

Customary methods for the expression of hæmoglobin values are also open to question. The practice of giving values as percentages of some standard, particularly without stating the standard, serves no useful purpose and causes confusion. The plan of giving hæmoglobin values as grams % is simple, obviates current difficulties, and makes possible ready comparison with the results of others.

SUMMARY

Determinations of hæmoglobin were made in two groups of elementary school children, aged 5 to 16 years, and in a group of 1,080 university women students. For 718 children the range of values was 9.0 to 16.1 gm. % with an average of 12.5. The range for young women was 7.2 to 16.1 gm. % and the average was 12.0.

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CYANOSIS IN INFANTS IN RURAL AREAS

(Well-Water Methæmoglobinæmia)

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INTERMITTENT or persistent cyanosis in an infant in the first few weeks of life is a cause for alarm to the parents and deep concern to the doctor. The physician naturally thinks of congenital heart disease, abnormalities of the respiratory tract, diaphragmatic hernia or enlargement of the thymus gland—all conditions which carry a serious prognosis. It is the purpose of this report to show that cyanosis in this age group may be due to methæmoglobinæmia brought about by the ingestion of contaminated well-water of high nitrate content. This condition is not necessarily serious and probably occurs much more frequently than has hitherto been suspected.

Since methæmoglobinæmia was first described in 1902,[1] sporadic cases have been reported from time to time. Usually the causative agent has been a drug such as acetanilide, phenacetin, potassium chlorate or one of the nitrates. With the introduction of sulfonamides, many more cases of methæmoglobinæmia were described. Enterogenous methæmoglobinæmia, a rare condition associated with diarrhœa in adults and probably due to absorption of nitrites from the

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gut, has also been described. Even rarer is congenital methæmoglobinæmia, which is occasionally familial.[2]

The reported cases of methæmoglobinæmia in infancy have nearly all been in association with drugs, usually the nitrates. Bismuth subnitrate used for roentgenological diagnosis has produced, in several instances, severe, even fatal methæmoglobinæmia in infants.[3] Roe[4] in 1933 reported death from methæmoglobinæmia of a month-old baby who was treated for diarrhœa by two-hourly doses of 10 grams of bismuth subnitrate. Within 24 hours the infant became cyanosed. Oxygen therapy made no difference to the cyanosis. The nitrate was stopped after 44 hours, but the infant died 60 hours after the first dose of bismuth subnitrate was administered. Ever since this case report pædiatricians have rarely used this drug and have found the subcarbonate quite satisfactory.

In 1940 Schwartz and Rector[5] reported a case of "Idiopathic Methæmoglobinæmia" in a two weeks' old infant in a small Montana town. The birth was normal. The infant had received no drugs. It was fed an evaporated milk mixture. There was no mention of the water used in the formula, but it was probably well-water. On admission to hospital the history was that of an intermittent cyanosis, which had suddenly become more intense. There was no evidence of disease of the heart or lungs. The cyanosis did not respond to oxygen or coramine. Spectroscopic examination proved the presence of methæmoglobinæmia. One c.c. of 1% methylene blue (3 mgm. per kilo body weight) was injected intravenously. The cyanosis disappeared within half an hour. At 8 months of age the baby was in good health and of normal colour. There seems little doubt that this is the first reported case of methæmoglobinæmia due to well-water.

In 1945 Comly[6] reported from rural Iowa two cases of methæmoglobinæmia in infants, caused by the use of milk formulæ containing well-water of high nitrate content. Two later articles[7, 8] have described similar cases occurring in Belgium and in rural Kansas.

The following are descriptions of one definite and one probable case occurring in rural Manitoba and rural Ontario.

CASE 1

Baby girl A.H., was born April 24, 1946. The delivery was normal; birth weight 7 lb. 11 oz. She appeared normal at birth except for minor bilateral malformations of the pinnæ of the ears. The mother, older brother and sister all have the same malformation. The baby's course in hospital was normal.

On the tenth day the baby was discharged to its home at Greenridge, Man. Coincidentally the mother's breast milk became scanty and the baby was given a formula of milk 16 oz., water 14 oz. and syrup 1 oz.

On May 27, at the age of 5 weeks, the baby was brought to the hospital at Vita, Man., because of cyanosis dating back to the age of 3 weeks. Except for the marked cyanosis no other findings were evident. The baby was immediately sent to Winnipeg for consultation, where she was promptly seen on arrival. She had now a peculiar slate-grey cyanosis, breathed somewhat rapidly and appeared rather listless, although not alarmingly so. There were no signs of disease of the heart or lungs. There was no diarrhœa. With the Iowa cases in mind, the parents were questioned about the water supply. It then developed that the mother had made the formula out of rain-water for the first two weeks and then had switched to well-water. The cyanosis had developed within a few days of this change. No drugs had been given.

Venous blood was drawn and sent to Professor F. W. White of the Department of Biochemistry of the University of Manitoba. It was chocolate brown in colour. A methæmoglobin band was seen on spectroscopic examination. (Colour photographs were taken of the baby for purposes of record.)

The parents were anxious to get home, and, since the baby's general condition was satisfactory, they were allowed to go, with instructions not to use the well until the water had been analyzed, and to give the baby ascorbic acid 25 mgm. every four hours.

Two days later the parents reported, by phone, that the cyanosis was almost gone by the time the baby reached home and was completely gone the next day. No ascorbic acid had been given by the parents, because of the evident, spontaneous improvement.

In January, 1947, the family doctor reported the baby to be in good health and of normal colour and appearance.

The well in question was examined by an inspector from the Manitoba Department of Health and Public Welfare and the following observations made. "The well is on down grade, 150 feet from the barn, 250 feet from the house. It was not well protected, had a wooden platform and the animals were watered close by. The well itself was 20 feet deep with a bucket conveyance and a manual lift pump. The yard around the house was found in a satisfactory condition. The barn yards were generally in an unsanitary condition with manure, water and pig-pen wastes, etc."

Mr. W. M. Ward of the Bureau of Industrial Hygiene analyzed the well-water and found 150 parts of nitrate and 0.92 of nitrite per million. A later specimen contained 250 parts of nitrate per million, indicating even greater contamination. The upper limit of safe nitrate content is regarded as 10 parts per million.

This then is a case of an infant developing methæmoglobinæmia originating in contaminated well-water of high nitrate content, and spontaneously cured by discontinuing the use of this water. Spontaneous recovery under these circumstances probably occurs frequently, and is

in accord with the observations of Halpern and Roche, quoted by Ferrant,[7] that if the toxic agent is withdrawn, sponataneous transformation of the methæmoglobin into normal hæmoglobin occurs and is almost complete after thirty-six hours.

CASE 2

Baby boy McG. was born in rural Ontario November 1, 1946. Birth story was uneventful. On December 14 he was given a formula consisting of evaporated milk, water and corn syrup. The mother's description of the course of events is quoted verbatim. "During the next week we noticed blueness and the following Saturday he was definitely ill but not continuously blue. Some days he would be positively deathlike in appearance and later in that same day would show improvement."

The infant became worse during Christmas week, did very little crying and appeared to be quite listless. On the advice of Dr. Colbert of Dryden, Ontario the baby was brought in to Winnipeg for consultation. He arrived on December 30 but was not seen by us until the following day. During this interval Winnipeg water was used in the formula. On examination in the office some thirty-six hours after his arrival in the city, his colour seemed normal and no evidence was found of any abnormality of heart or lungs. The mother expressed embarrassment at bringing an apparently normal baby several hundred miles to a doctor's office but was obviously pleased at the evident recovery of her baby. An x-ray film of the infant's chest was normal. In view of our experience with the previous case the mother was advised to have the well-water used in preparation of the formula analyzed and was warned not to use this water until the report was received.

Dr. A. R. Bonham, chief provincial analyst of the Ontario Department of Health reported that the well-water contained 110 parts of nitrate per million.

On February 4 the mother wrote as follows: "The baby is now in splendid health and there has been no recurrence of blueness. . . . I now use water from a well 100 yards from the house. The well containing the nitrate is inside the house—the well from which I am using water now is outside."

MECHANISM OF PRODUCTION

Methæmoglobin is normally present in blood to the extent of 1%.[11] It is not toxic in itself, but is unable to carry oxygen. When two-thirds of the hæmoglobin of a dog has been transformed into methæmoglobin, death results.[10]

The mechanism by which methæmoglobinæmia is produced in infants has been explained as follows: it is established that the nitrite ions, by uniting with hæmoglobin, produce methæmoglobin. Normally neither nitrites nor nitrates are ingested. When nitrates are ingested or produced in the intestinal tract these are not absorbed but are reduced to nitrites, and then to ammonia and excreted as such. In the presence of greatly increased quantities of nitrates, due either to ingestion of nitrate drugs or of well-water with a high nitrate content, it is possible that the nitrites have no time to be completely reduced, and reach the circulating blood. This is particularly apt to occur if diarrhœa is present. Perhaps the mucosa of the infant allows more rapid absorption of nitrites. The nitrite ion is the effective agent in the production of methæmoglobinæmia. This has been well established by several investigators. A molecule of nitrite ion reacts with two molecules of hæmoglobin to form methæmoglobin.

Normally methæmoglobin is reduced by an enzyme system within the blood corpuscles. However if methæmoglobin accumulates in great excess this mechanism may break down and the amount of methæmoglobin in the blood may rise to dangerous levels. Simple withdrawal of the source of excess nitrite results in the almost complete disappearance of excess methæmoglobin in 36 hours.

For the infants reported herewith, and from Iowa, Kansas and Belgium, water with a high nitrate content due to contamination of improperly constructed wells by animal and vegetable waste, was used in making up evaporated or powdered milk feedings. The ingestion of excess nitrate resulted in cyanosis, which, in our cases and in some of the previously reported cases, cleared up spontaneously within 36 to 49 hours after discontinuing the use of the contaminated well-water.

Frequency.—Clinical methæmoglobinæmia in infancy due to the ingestion of well-water is probably more common than realized. Cases have so far been reported from rural areas of Iowa, Kansas, Belgium, Manitoba and Ontario. The publication of these cases has brought to light many other cases of transient cyanosis by physicians who were previously unaware of the cause of the methæmoglobinæmia.

When one considers how many thousands of poorly constructed, contaminated wells there must be in rural areas in Canada, one wonders why more cases of well-water methæmoglobinæmia have not been reported. There are probably many cases of minimal transient cyanosis that are never seen by the doctor. The more severe cases which find their way to a consultant usually arrive too late to show the characteristic cyanosis since there is a natural tendency to rapid disappearance of the

methæmoglobin if the infants are fed milk mixtures which are free of nitrates.

All the reported cases have occurred in infants in the first two months. No cases have occurred among older children even though the same well-water of high nitrate content was used for drinking. This suggests that the two factors most concerned in the production of methæmoglobinæmia are the nitrate content of the well-water and the body weight of the infant. Infants fed on breast milk or undiluted acidified milk mixtures would not be likely to develop the disease. The risk of methæmoglobinæmia rises proportionately with the amount of water used in the infant's feedings. The incidence of cases of well-water methæmoglobinæmia would therefore be greatest in areas where farm sanitation was poor, wells poorly constructed and dried milk mixtures extensively in use.

Prognosis.—The only reported death is in a case of Ferrant's.[7] If the condition is promptly recognized and the contaminated well abandoned spontaneous recovery may be expected within a matter of two or three days. Treatment with methylene blue appears to be very successful in the more severe cases.

Treatment.—(1) Spontaneous recovery. In both of the reported cases no treatment was given other than discontinuing the use of the suspected well-water. The most important factor in treatment is therefore the recognition of the disease. Complete recovery occurs within one or two days.

(2) Methylene blue. In 1933 Williams and Challis[12] reported the use of methylene blue in the treatment of methæmoglobinæmia due to aniline dye poisoning. Experimentally methylene blue will reconvert methæmoglobin to hæmoglobin in 10 minutes, if the methæmoglobin content has not risen to more than 40 to 50% of the total pigment. One mgm. per kilo body weight is given intravenously. (0.5 c.c. of 1% methylene blue to an infant weighing 8 lb. would be a suitable dose.) This is the method of choice for severely cyanosed cases.

(3) Ascorbic acid. This has been successfully used by Barcroft in the treatment of familial methæmoglobinæmia where the normal enzyme system is at fault. Barcroft is not optimistic about its value in methæmoglobinæmia due to drugs, and no reported cases of its use in these cases have been noted.

CONCLUSION

1. Two cases of cyanosis in young infants due to excessive nitrate in contaminated well-water are reported.

2. Spontaneous recovery occurred in both cases.

3. Well-water methæmoglobinæmia should be considered as a possible cause of cyanosis in an artificially fed infant.

4. The ideal feeding for an infant is breast milk. Where the water supply is suspected the safest artificial feedings are those that require the least water in their preparation. In order of safety these would be: (*a*) undiluted acidified milk mixtures; (*b*) cows' milk mixtures; (*c*) evaporated milk mixtures; (*d*) dried milks.

Since this article was submitted, one baby has been seen personally, and three others heard about by personal communication. All of these babies had marked cyanosis in the first two months of life, and all recovered within a few days of changing the source of water in the formula. All were artificially-fed babies living in rural areas. The water in each case is being tested for nitrate content.

Dr. Bruce Chown, Pathologist, Children's Hospital, Winnipeg, gave valuable suggestions in the preparation of this paper. Dr. Frank W. White of the Department of Biochemistry of the University of Manitoba, did the blood analyses. Mr. M. W. Ward did the water analyses. Dr. Max Bowman of the Department of Health and Public Welfare, gave valuable assistance in investigating the well in the Manitoba case.

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The office of apothecary is of very ancient date. The Greek and Roman physicians were their own apothecaries, and when they ceased to act in that capacity is not exactly known. Conring asserts (*De Antiquitatibus academicis*) that the physicians in Africa first began to give up the preparation of medicines as early as the time of Avenzoar, in the eleventh century. This accounts for many Arabic terms of art being introduced into pharmacy and chemistry, and explains why the first known apothecaries were in the lower part of Italy and their legal establishment in the kingdom of Naples.

HEADACHE: TREATMENT WITH HISTAMINE*

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IN Bing and Haymaker's Text,[1] the section on Headache begins—"There is no symptom in all the realm of neurology which the physician is more often called upon to treat than headache". We may alter this to state that headache is the most difficult and nebulous complaint and the one least susceptible to permanent therapeutic relief which presents itself to the practitioner of any branch of medicine. This article is an attempt to assess the results of intravenous histamine in the treatment of a variety of ills where the presenting complaint was headache. No attempt is made to establish new diagnostic categories but everything possible was done to exclude recognized organic and psychiatric syndromes with the exception of migraine.

Our interest was aroused when one of us developed a persistent headache and the usual investigations were performed. First, the sinuses, and then the blood pressure was checked. A mild muscular ocular imbalance was corrected but the headache was unchanged. Finally histamine, in subcutaneous doses of increasing strength, was started and a gratifying improvement appeared. We wondered then whether some of our patients with the same complaint could not be helped in a similar manner. We were already familiar with Horton's work but had not thought of applying it to simple headache. The literature available revealed that Clark, Hough, and Wolff[2] in 1936 found in experimental studies on the production of headache that the pain "produced was proportional to the degree of dilatation and stretch of the intracranial vessels and perivascular tissues". Further studies (Shumacher, Ray and Wolff[3]) with histamine, led to the postulation that large arteries at the base of the brain, and the proximal portions of their branches are the primary sites of origin of pain in headaches resulting from histamine.

The pathways appear to be: (*a*) 5th cranial nerve, the principal afferent pathway for headache resulting from dilatation of supratentorial cerebral arteries, and the pain is felt in the fronto-tempo-parietal regions; (*b*) the upper cervical nerves are the most important pathways for headache resulting from dilatation of the arteries of the posterior fossa and the pain is felt in the occipital region. Pickering[4] while investigating circulation time became interested in the effect of intravenous histamine and charted graphically the relationship of the cerebrospinal fluid pressures and the blood systolic pressure in relation to the occurrence of flushing and headache. He found that flushing appeared as the cerebrospinal fluid pressure increased (dilation of cranial vessels) and the systolic pressure dropped, and waned with the return of these pressures to normal. The headache appeared somewhat later than the flush, starting at the peak of the increased cerebrospinal fluid pressure and the lowest point of the systolic blood pressure.

Horton *et al.*[5, 6, 7] after studies of the relationship of histamine to hypersensitivity to cold described a syndrome produced by subcutaneous injection of histamine substance, calling it "erythromelalgia of the head", or "histamine cephalgia". They stated that injection of 0.1 to 1.2 mgm. of histamine induced a typical attack in a patient with the above symptoms.

They also used histamine in treating headaches of long duration, resistant to ordinary forms of therapy and disabling in degree. They found poor results in headaches of psychoneurotic origin and concluded also that the histamine therapy is "not effective in treatment of commoner types of severe headaches".

CLASSIFICATION OF HEADACHE

Excluding from our discussion the headaches of intracranial tumour, the headache of hypertension and other proved organic disturbances, we are left with a much larger group in which no definite disease process or significant pathological tissue change has been demonstrated.

1. The simple *psychoneurotic headache* is typically a "tension headache", and may be explained on the basis of hypertonic musculature of the scalp, particularly the temporals. It is felt as a dull chronic superficial discomfort, poorly localized; the tension is obvious too in generalized symptoms throughout the body.

* This article does not express an official attitude and the opinions and methods are entirely those of the authors.

2. The headache of *overindulgence,* poor ventilation, obstipation, fatigue. For these the precipitating cause is quite obvious, though the mechanism is not clearly known.

3. The diagnosis of *migraine* is more often than not incorrectly made. True migraine (*i.e.,* cryptogenic), is not so common as is usually thought. As an entity migraine is commonly of familial incidence, often in a definite personality type and appears usually in adolescence. It occurs, frequently preceded by an aura, in definite attacks where the patient is obviously seriously distressed, is nauseated and vomits, cannot work or eat, or stand noise—coming on usually in the forenoon. Characteristically the patient is entirely free of interim headache and feels perfectly well until the next attack. The typical severe headache is usually one-sided, at least at the onset, and occurs more often during periods of relaxation, *e.g.,* week-ends, holidays. When a patient states that ordinary work produces headache it is almost certainly hysterical or due to a definite organic lesion.

4. Another common type of headache is that associated with *myalgia,* where the discomfort is felt in the frontal and occipital regions. Here are found nodules due to a localized hypertonus and the muscles are tender to palpation and to stretching. Heat, light, and salicylates are very helpful.

5. *Situational headache.*—In many individuals who do not show sufficiently significant deviation from the usually accepted norms to be classified as psychoneurotic, unpleasant and difficult situations will give rise to headache of variable intensity and duration. This type is so common that it has become recognized in everyday colloquial language and since it practically always disappears with the precipitating situation it is of no great concern medically, except that the physician should recognize it and avoid fostering undue concern in the patient.

6. *Post-traumatic headache* (so-called). The recent work of Simons and Wolff[8] has done much to elucidate the mechanisms by which pain is produced in this group and we agree with them and other writers, notably Kozol,[9] that with certain rare exceptions, *e.g.,* chronic subdural hæmatoma or extensive scarring in meninges or scalp, this group of symptoms is the result of emotional tensions which may originate in a variety of circumstances but generally speaking is associated with the fear of being unable to make the grade in a highly competitive world. In many of these cases even where there is marked physical and mental impairment the complaints of headache, etc., disappear more or less completely when the individual can be placed in secure employment which is not beyond his capacity. This is equally true of individuals who are obviously totally incapacitated and in receipt of full compensation.

7. *Hysteria.*—The mechanisms here are clearly not the same as those of the tension states referred to above. The typical hysterical personality is present; the complaints are usually bizarre and almost always associated with a marked degree of dependency and unwillingness to make any sort of real effort. No form of treatment produces lasting benefit so long as the patient has anything at all to gain by his illness and since he can always gain some sort of (to him) satisfactory recognition, he will remain ill in spite of anything the physician can do.

Making use of this classification, we were still left with a fairly large number which did not fit well into any of the groupings and since they all appeared to be considerably handicapped and had passed through the hands of internists, ophthalmologists, rhinologists, surgeons and psychiatrists without notable benefit we felt justified in trying anything which might give some lasting relief.

For obvious reasons those cases in which symptoms are assumed or exaggerated for the purpose of financial gain are not included in the discussion.

The first step in our investigation is a complete description of the patient's "headache".

1. Date of onset.
2. Type of headache (dull ache, pain, discomfort, etc.) also description, *i.e.,* throbbing, dull, band-like, bursting, etc. and does the type change? any flushing lachrymation, etc.?
3. Frequency—(How often and how long does it last?)
4. Location (one sided?, temporal?, occipital, etc?).
5. Degree of severity (this may be judged by interference with work, and appetite—also whether or not it prevents sleep or interferes with recreation).
6. Factors contributing to its onset and aggravation (fatigue, work, exertion, bodily movements, shaking head, concentration, etc.).
7. Factors helping it (rest, sleep, food, purgatives, antineuralgics.
8. Familial incidence of headache.

We usually perform testing with intradermal histamine (I.D.H.) using 1/10 c.c. 1/1,000 solution histamine phosphate. Whether or not a wheal and flare develops a subcutaneous injection of 0.3 c.c. 1/1,000 solution histamine is given after 15 to 20 minutes to see if the habitual type of headache is produced. If it is,

a flush, lachrymation and salivation and a feeling of heat is almost always complained of, in association with the headache.

Some of our patients did not show reactions to either injection but we still proceeded with our routine of intravenous histamine desensitization* in an effort to determine if there was any demonstrable prognostic value in the test.

METHOD

We discarded the subcutaneous method of "desensitization" as taking too long and instead used a method suggested by Rainey[10] with a modification. This author concluded that a single administration should be repeated two or three times. We, therefore, instead of dissolving 1 mgm. histamine substance (2.75 mgm. histamine phosphate) in 250 c.c. saline, used 3 mgm. histamine substance (*i.e.*, 3 ampoules 1/1,000 solution). The solution is given by intravenous drip, starting very slowly and increasing to tolerance, as judged by symptoms and fall in blood pressure. Our routine has been constant supervision, with the pressure determined every ten minutes. If the patient experiences an excessive amount of discomfort or the systolic and diastolic pressure drop too alarmingly the rate of flow is decreased.

Starting at 5 to 10 drops per minute for the first few minutes and increasing gradually—most patients quickly tolerate up to 60 drops per minute, hence it requires approximately an hour to administer the full dosage.

The patient remains in bed until he feels well enough to be up and about, usually only a short time (less than an hour).

TYPICAL CHART
HISTAMINE DESENSITIZATION PROCEDURE

Date		*Name of patient*	
Time	*Blood pressure*	*Drops per min.*	*Remarks*
a.m.			
9.30	110/70	20	Started.
9.40	110/70	40	Head feels tight. No ache. Eyes blurry.
9.50	100/68	50	Face red. Headache. Eyes heavy and dull.
10.00	100/68	60	Face red. Eyes heavy. Headache over forehead.
10.10	100/68	60	Same.
10.20	100/60	60	Headache same.
10.30	100/60	60	Eyes feel heavy. Headache more severe over right eye.
10.40	100/60	60	Same.
10.50	100/50	60	Headache improved. Face still red.
11.00	105/70		Completed. Slight headache.

Precautions.—Our patients have been a young, healthy group. In older, especially arteriosclerotic, patients care should be exercised. We have had no untoward abdominal complaints but ulcer patients probably should not be subjected to this therapy. Hyper-reactors and patients with allergic diseases should be treated with care. Asthmatic or urticarial attacks can readily be controlled by ascorbic acid or epinephrine and probably benadryl, although we have had no personal experience with it.

* We realize that this term is not strictly correct but it is used in the sense that the routine is directed to diminishing the reaction of the patient to the liberation of histamine in the body.

CASES TREATED

A review of our cases reveals a heterogeneous assortment. Mainly referred from E.N.T. and Medicine the only common factor which appears to be present is the outstanding complaint of persistent headache. The follow-up was made by mail. If it is remembered that our patients, being ex-servicemen, and with a trend towards "pension-consciousness", will seldom admit improvement unless it is definitely present, it will be obvious the results claimed are conservative to say the least.

Of the total number, perhaps 25 in all, only 13 were suitable for this report (all documents available, answers received to mailed questionnaires). We did not exclude any cases that replied to our questionnaire nor did we try to select our cases. We repeat, this is an unselected series, who had a presenting complaint of headache, for which no adequate cause could be found.

QUESTIONNAIRE *re* HEADACHE

1. Since treatment has your headache changed in *severity?*
   (*a*) Less severe. (*b*) Unchanged. (*c*) More severe.
2. Since treatment has your headache changed in *frequency?*
   (*a*) Less often. (*b*) Unchanged. (*c*) More often.
3. Since treatment has your headache changed in *type?*
   YES..... or NO.....
   If "yes" of what type is it now?.....
   .....
4. Frankly, do you feel that this treatment has helped you?
   YES..... or NO.....

ILLUSTRATIVE CASES

CASE 1

Was diagnosed fracture and displacement cervical vertebræ, but in hospital no evidence of present or past displacement by x-ray or examination. Electrocardiogram normal. I.V.H. given empirically. Personality defect in this patient and we felt complaints were excessive. Headache was a dull ache, generalized, vaguely uncomfortable.

Answer: "Just ordinary headache once in a long while. Helped very much by treatment."

CASE 8

Migraine diagnosed, with aura of exhilaration and feeling of bodily lightness, blindness in left eye appears, goes to dark quiet room, occasionally vomits. I.V.H.—said to have no relief. The following week supplied with ergotamine tartrate—discontinued after two weeks.

Answer: (After six months). "Treatment has cured my headaches completely".

CASE 11

Fractured skull 1941. Now has headaches and dizziness, sharp twinges in both temples, "pressure" bilateral frontal appearing with overtiredness and overeating and heat. Organic damage ruled out. I.D.H. positive and s.c. produced headache. I.V.H. desensitization performed.

Answer: "Helped for a period of time but headache has come back".

CASE 14

Three years of severe ocular and retro-orbital pain, relieved when, very severe, only by gr. ¼ to gr. ½ morphine. Neurological examination negative. Admission diagnosis tic douloureux not confirmed. C.S.F., x-ray, visual examination negative. Positive I.D. testing, s.c. did not produce typical headache. Probably histamine cephalgia. This patient was completely disabled by this condition. Known to be completely stable.

Answer: "Haven't had the headache since treatment". (Eight months ago.)

Tabulations of reported results: improved 6 temporary (one temporarily improved but relapsed); markedly improved 1; no further attacks 2; Unchanged 5.

DISCUSSION

Of the 14 patients who reported, 5 experienced no benefit whereas the remainder got some degree of relief. Any attempt to obtain prognostic criteria from our data bogs down hopelessly. The reaction to subcutaneous or intradermal histamine injection is obviously of no value. Efforts to base a prognosis on the type of headache or the circumstances under which it occurs seem equally futile. One case which we felt fulfilled rather closely the criteria for Horton's histamine cephalgia was not helped at all whereas another case was completely relieved. The same is true of the two cases which seemed to almost fulfill the requirements for a diagnosis of migraine. It is interesting that in three cases with undoubted personality disorder, probably due to poor early environment, relatively good results were obtained, whereas in Case 2 with a family and personal history of severe alcoholism no benefit was admitted. It does appear that the patients with the more severe and paroxysmal symptoms did better than those who complained of persistent dull discomfort, but the series is much too small for this conclusion to be statistically valid.

In any study of this nature one has to consider the possibility of the results being due, in part, to suggestion. Most of these patients had been subjected previously to various forms of therapy in which suggestion plays a large part and moreover were told that this was a relatively untried form of treatment and that we had no idea whether or not it would be helpful in their particular case. With these facts in mind, we feel that suggestion played little if any part in producing the improvement reported.

CONCLUSION

We have presented a rough working classification of so-called functional headache and an attempt to assess the value of administration of intravenous histamine in a residual group which could not readily be fitted into any of the accepted categories. A significant number of these showed a gratifying degree of improvement and, while we have been unable to establish any valid prognostic criteria and freely admit that the method is empirical and has no sure scientific basis, we feel that the results are sufficiently good to justify its retention in our armamentarium.

We wish to acknowledge the assistance of our nurses, M. MacG. Graham, R.N. and Clyde Weir, R.N., in administration and supervision of this routine.

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The upshot of this discussion is this. Science, like other intellectual disciplines, has its own beauty and plays a part in revealing to us the beauty of nature. It is not unrelated to wisdom, though not wisdom itself. It can be integrated into the good life, though itself providing none of the principles of the good life. At every turn scientific life depends upon disciplines other than science. Without a liberal culture we shall miss most of the significance of science.—E. F. Caldin.

ROENTGENOLOGICAL LOCALIZATION OF URETERAL OBSTRUCTION BY NON RADIO-OPAQUE OR INDISTINGUISHABLE CALCULI*

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THE determination of ureteral obstruction and its exact localization is most important, for it is upon the relief of this obstruction that the function of the kidney rests. In a general hospital ureteral obstructions are a common feature and present a dramatic aspect as well as a clinical problem. Admitted as emergencies, they command the collaboration of various departments. It is not always easy to differentiate the acute ureteral colic from other conditions, such as acute appendicitis, perforated ulcers, acute pancreatitis, or other acute abdominal conditions. In such cases the urologist and radiologist must work as a team.

It is our purpose to describe a method of localizing exactly the offending agent causing ureteral obstruction, be it opaque or non-opaque, its nature being immaterial. We make use of intravenous urography to demonstrate the site of obstruction.

As early as 1942, while in service with a Canadian General Hospital Overseas, opportunity presented itself to the senior author to observe a large number of patients suffering from nephro- and uretero-lithiasis. With the collaboration of Lieut.-Col. G. M. Spooner, urologist at the same hospital, first steps were then taken to demonstrate and localize ureteral obstruction caused by opaque and non radio-opaque calculi. Further observations were carried out at the Montreal Military Hospital from February, 1945 to April, 1946.

During this period there were 9,770 admissions to the hospital, including 727 for radiological genito-urinary investigations. Of this last figure, 51 suffered from nephro- and ureterolithiasis. We would like to limit our remarks mainly to our observations gathered at the Montreal Military Hospital. Tables I, II and III summarize clearly and briefly the types of calculi and their location.

TABLE I.

CALCULI IN G. U. TRACT

A. Right kidney	10	
Left kidney	12	
Both kidneys	2	
	—	24
B. Right ureter	12	
Left ureter	8	
	—	20
C. Both kidneys and right ureter	2	
Both kidneys and left ureter	1	
Right kidney and right ureter	2	
Left kidney and left ureter	1	
	—	6
D. Bladder only	1	
(other cases included above had calculi in bladder)	—	1
		51

TABLE II.

URETERAL CALCULI

A. At ureterovesical junction		
Right	7	
Left	7	
B. At pelvic brim		
Right	3	
Left	1	
C. At ureteropelvic junction		
Right	2	
Left	0	
	—	20

TABLE III.

TYPE OF RENAL AND URETERAL CALCULI

A. Opaque but indistinguishable	20	
B. Non radio-opaque	6	
	—	26
C. Distinguishable		25
		51

Thus we see that although 25 of the stones were easily distinguishable, there were 20 other cases with opaque stones which were indistinguishable from a maze of calcifications and phleboliths. Besides, there were six cases with absolutely non radio-opaque opacities. We were able to identify by our method not only the easily distinguishable stones, but also the elusive ones. The pointing finger of the intravenous dye picked out the incriminating stone without fail. Moreover, it did not matter to the dye whether the stone was radiologically opaque or non-opaque. Thus besides the opaque calculi, we were able to identify definitely 26 of the cases which could not be identified and isolated by any other method.

In the majority of cases, the urologist feels that there is some obstruction in one of the ureters, but it is up to the radiologist to prove whether a stone is present or not, and, if it is present, to localize it accurately. We all know that it is of the utmost importance to give to the urologist this urgent information, for his treatment varies with the type of block. If

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the stone is low and it moves, all that is required is careful watching; but if the stone is high and impacted, early surgical intervention may be an absolute necessity if the kidney is to be saved.

METHOD OF EXAMINATION

The radiological investigation should be commenced as soon as possible. Twenty cubic centimetres of dye is introduced intravenously. It is not true that the degree of pain or the possibility of a ureteral block constitute a contraindication to the administration of the dye. In our cases, we never had to record any complications, and on one occasion we even had administered the dye in a case suspected of bilateral ureteral block without ill effects. As a matter of fact, we were able to demonstrate both ureters obstructed by sulfonamide crystals and thus aid the urologist in removing them. We urgently recommend that the dye be administered promptly in any case of ureteral obstruction, otherwise very valuable information may be lost.

Following the administration of the dye, roentgenograms are taken at five minute intervals for the first fifteen minutes. Abdominal compression must not be used in cases suspected of lithiasis, for needless to add, our visualization method is essentially functional.

It is obvious that if a stone is causing partial obstruction, there will be interference in the passage of urine. The latter collects above the block distending the upper portion of the collecting system, and interfering with the normal function of the kidney. This is essentially due to the mechanical obstruction. Therefore, it is to be expected that the dye introduced intravenously will be excreted more slowly, if at all, by the affected side. In other words, the excretion of the dye by the kidney parenchyma varies directly with the residual function of the kidney. The more complete the obstruction and the less the retained function, the less will the dye be excreted.

We thus come now to our first roentgenological sign of ureteral obstruction. As we examine the first few plates we note with amazement the clear-cut outline of the collecting system on one side and the lack of visualization of the collecting system on the other side. This is so striking that were it not for the two kidney shadows one would be tempted to diagnose a solitary kidney (Figs. 1 and 2). We have called this first sign *the early radiological evidence of ureteral block.* But there is more than coincidence why one kidney excretes the dye promptly and the other not at all. The reason may mainly be found in the difference of function of the kidneys. And when we observe this marked difference we may strongly suspect partial obstruction due to opaque or non-opaque calculi.

As we continue taking plates at intervals of fifteen minutes, we note on subsequent films that the renal shadow, which was not clearly distinguishable at first, begins to be visible. Moreover, it becomes denser and denser with time until finally it stands out more prominently than the normal kidney on the other side. In the surrounding darkness of the abdominal contents, it shines as brilliantly as a comet. This *impregnation of the renal parenchyma* we have arbitrarily classified as the second radiological sign (Figs. 3 and 4).

Following this apparent impregnation of the kidney parenchyma, accurate supervision and follow-up are of the highest importance. We now know from the above signs that an obstruction exists; we must however localize this obstruction. Patience is the guide word. The usual intravenous pyelogram lasts thirty minutes. Some authors have urged that the taking of plates after two hours should be discontinued. We, on the other hand, do not pay attention to time. Localization of the obstruction is of prime importance.

Of course, ureteral obstructions vary in degree. With a more complete block the urine detained above will pass more slowly and will delay the renal function as well as the excretion of the dye. Therefore, the lapse of time required to show the impregnation of the parenchymal tissue will give an approximation of the time required for the visualization of the collecting system above the obstruction.

Now that the parenchyma is densely impregnated with dye, the minor and major calyces begin to show up. Soon they stand out most prominently like the tail of a comet, and can be easily distinguished even against the white background of the kidney parenchyma. In the majority of cases the calyces are distended and full. As we continue taking plates every fifteen or thirty minutes we note the filling of the kidney pelvis with dye. Soon after, the ureter becomes distinguishable. The dye comes slowly down the ureter and at the

site of obstruction it is definitely and sharply delayed. No dye will be seen below the obstruction. There can be no clearer indicator to the site of the obstruction than the dye itself. It points to the calculus just as unfailingly as the compass needle points to the magnetic North. We have called this third

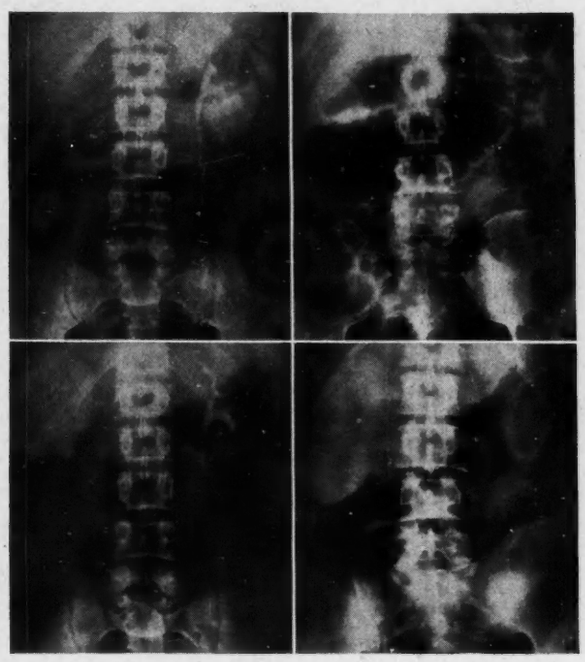


Fig. 1.—Non-visualization of the right collecting system. Taken five minutes after intravenous injection of the dye. The collecting system on the right is not visualized, while the minor and major calyces and the pelvis on the left stand out clearly. The more marked concentration of the dye on the normal side is not unusual. **Fig. 2.**—Non-visualization of the left collecting system. Ten minutes after injection of the dye. There is non-visualization of the collecting system on the left, while the right is well outlined. Note the pressure of gas in the bowel, which is an occasional occurrence in cases of severe ureteral obstruction. **Fig. 3.**—Impregnation of the renal parenchyma. Forty-five minutes after the injection of the dye, the right kidney shadow stands out most prominently. This is the same case as in Fig. 1. Note the normal collecting system on the left. **Fig. 4.**—Case suspected of bilateral ureteral obstruction. Thirty minutes after intravenous injection of the dye, note marked impregnation of the renal parenchyma in both kidneys. The renal shadows stand out most prominently. Enlargement of the renal shadows is a common finding with ureteral obstruction.

sign, *the stasis*. It is worthy of note that the more complete the obstruction, the longer it takes to observe this stasis, or delay. This is clearly illustrated by the following radiographs (Figs. 5, 6 and 7).

Occasionally, as when the obstruction is at the ureterovesical junction, the dye in the ureter is partially obscured by the bladder shadow. However, even in such cases the site of obstruction can easily be ascertained through the faint bladder shadow. Moreover, emptying the bladder will cast all doubt aside.

By the time we have our obstruction localized, we note that the dye outlining the collecting system on the normal side has come and gone. In other words, at the beginning of the investigation the obstructed side shows no sign of excretion of the dye, while the normal side is clearly distinguishable. But at the end of the examination we have our obstructed side clearly visible, while the dye on the normal side is no longer seen. This can easily be explained if we realize that the partial obstruction causes a delay in the excretion of the dye. After the intravenous injection of the dye the normal functioning kidney excretes it in the usual time and the collecting system is well visualized. But, on the obstructed side, there is a delay in function and the collecting system is not visualized immediately. After a few hours the dye from the normal side has departed, but on the obstructed side, however, it was retained above the site of obstruction. Briefly then, the partially obstructed ureter causes a delay in the function of the kidney and thus a delay in the excretion of the dye. The radiograph obtained is a mirror image of the visualization of the collecting system at the beginning of the examination. This confirmatory sign has been called a *reverse visualization of the collecting system* (Figs. 1 and 5).

COMMENTS

We have described the four essential radiological signs which help us, first to determine whether ureteral obstruction exists, and secondly to localize the obstruction. We would like now to comment further on our observations and to discuss some of our cases more fully.

It is interesting to note that there is a definite relationship between the degree of the ureteral block and the pain suffered by the patient. In other words, if a patient is complaining of severe pain necessitating repeated sedation, it will require a longer time to visualize the stasis and thus localize the obstruction. This is most important, for the complaints of the patients, and the slowness of the third stage, in some cases, may deter us in our effort to localize the stone.

It is commonly accepted that a partial but constant interference in the ureteral transit such as the presence of congenital aberrant vessels or

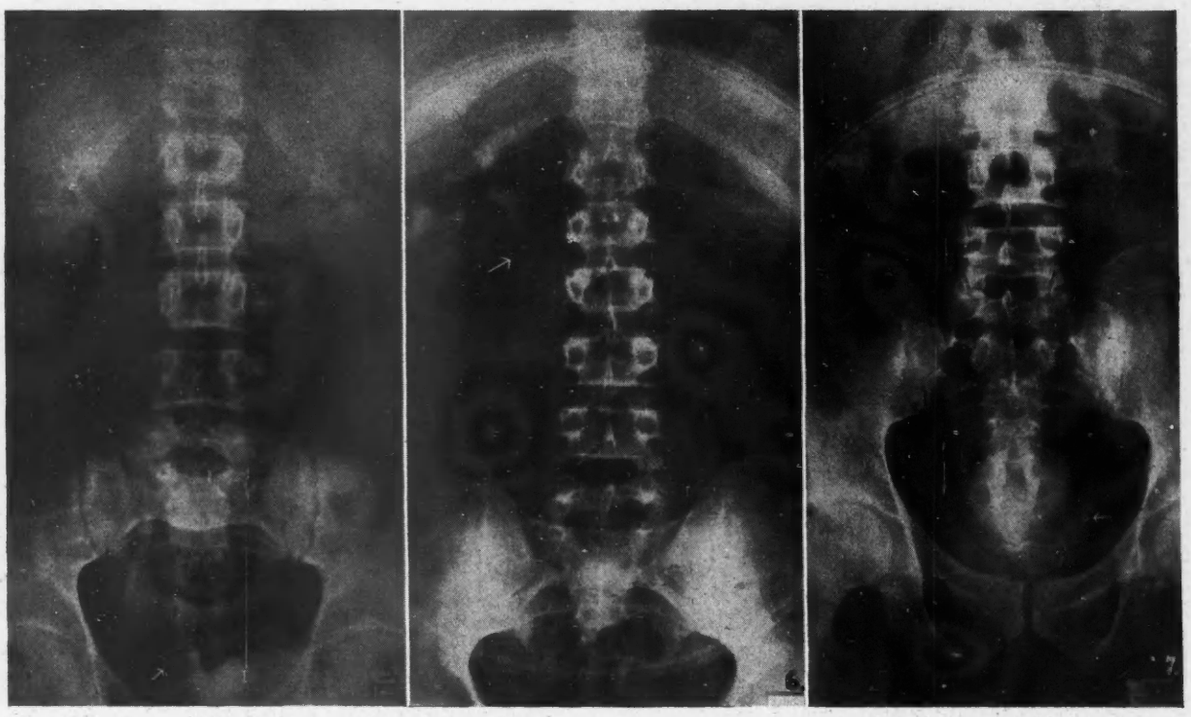


Fig. 5.—Three hour "stasis". Three hours after the intravenous injection of the dye the right collecting system is well visualized down to the uretero-vesical junction, where the indistinguishable obstruction was lodged. Note the dilatation of the collecting system on the right above the block. The collecting system on the left is no longer visible as the dye was drained away. **Fig. 6.**—Three hour "stasis". Three hours after the intravenous injection of the dye the collecting system on the right is well visualized down to the right uretero-pelvic junction. Note the absence of dye in the right ureter below the obstruction. An aluminum cone is sometimes used to displace the abdominal contents. **Fig. 7.**—Twenty-four hour "stasis". Twenty-four hours after the injection of the dye the left collecting system is well visualized down to the left uretero-vesical junction, where the small opaque calculus is clearly seen.

adhesive bands at the uretero-pelvic junction, may be the etiological factor in hydronephrosis. The constant pressure from without will delay the passage of urine through the ureter. With the passage of time, this will cause an alteration or even complete suspension of the renal function. In the early stages the dye will show a delay in excretion, as previously described for obstruction due to ureteral calculi. Later the dye will fill pockets of variable size as well as demonstrate a stasis of several hours above the uretero-pelvic junction. This is best illustrated by the following case history:

CASE 1

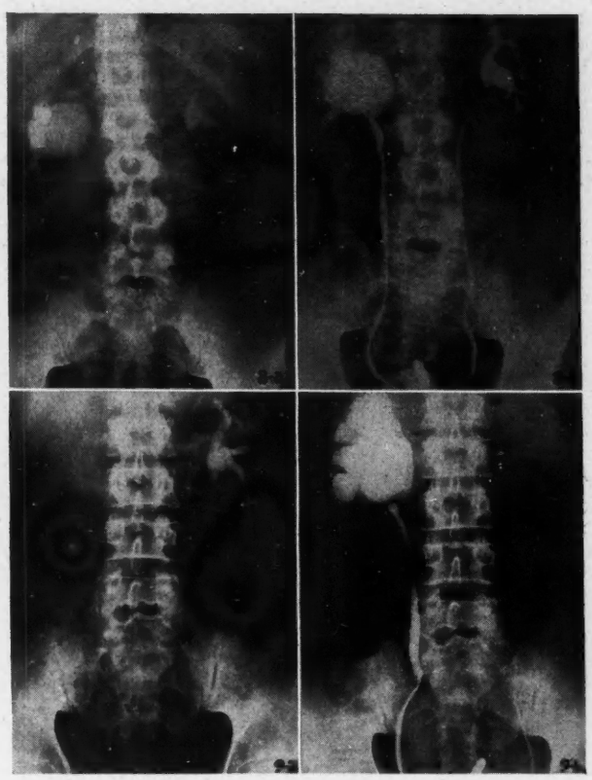
L.F. was admitted on March 26, 1946, complaining of an ache in the right upper abdomen. He previously had an attack of acute pain in the right loin in December, 1945. Admitted to a Canadian General Hospital Overseas on January 8, 1946, he was operated on for anomalous renal vessels obstructing the right renal pelvis and causing slight hydronephrosis. After the operation he felt fine, except for a fullness in the right upper abdomen. He was admitted to Montreal Military Hospital for recheck on March 26, 1946.

An intravenous pyelogram on March 28 revealed a marked hydronephrosis on the right (Fig. 8-a). On April 1, a retrograde pyelogram and cystoscopy demonstrated the phenolsulphonphthalein dye appearing on the left side in five minutes, and only a faint trace of dye on the right in twelve minutes. Marked hydronephrosis of the right kidney was evident (Fig. 8-b). Right nephrectomy was performed on April 15, and recovery was uneventful.

However, if the stricture has been more complete or of longer duration, the renal function may be destroyed entirely. In such cases one can not tell at first whether one is dealing with a congenital solitary kidney or with one whose function has been destroyed. As far as the patient is concerned it really makes no difference. He has now just one functioning kidney, but this could have been averted had the stricture been removed much earlier. The following case history and figures will demonstrate this more clearly:

CASE 2

A.M. has had repeated attacks of right sided pain since 1939. He had an appendectomy in 1945. Physical examination was essentially negative. On March 4, 1946, an I.V.P. revealed both kidney shadows, but only the left was functioning (Fig. 9-a). There was no dye secreted on the right even after two hours. Cystoscopic examination on March 6, revealed normal excretion of phenolsulphonphthalein on the left in four minutes and no excretion on the right in twenty minutes. A retrograde pyelogram revealed a marked hydronephrosis on the right (Fig. 9-b). A right nephrectomy was performed on March 13. An aberrant vessel was found to be the cause of the hydronephrosis.



Figs. 8-a and 8-b. (Case 1).—Plate a taken 45 minutes after intravenous injection of the dye. Marked hydronephrosis on the right, but some function still left. Dye was retained on the right for over six hours. Plate b after the retrograde injection of 12.0 c.c. of dye on the right and 6.0 c.c. on the left. Note distended minor and major calyces and right pelvis. Although aberrant vessels have been cut on the right four months previously, kidney function has been irreparably damaged. **Figs. 9-a and 9-b.** (Case 2).—Plate a fifteen minutes after injection of dye. No visualization of dye on the right. This persisted for over two hours, suggesting non-functioning right kidney. Plate b after retrograde injection of dye in the right ureter. Note constriction of ureter at ureteropelvic junction, and marked hydronephrosis on right caused by an aberrant vessel.

Therefore, if a calculus is causing the partial obstruction, instead of an aberrant vessel at the ureteropelvic junction, the same alteration in the kidney function will result. The following brief case history will illustrate this clearly:

CASE 3

E.A., aged 19, was transferred from another hospital on December 15, 1945 for removal of a calculus impacted in the right lower ureter. An intravenous pyelogram on December 17 revealed a dilatation of the collecting system on the right, with a stasis of about 1 hour (Fig. 10-a). On comparing this I.V.P. with the one taken at the other hospital in October, 1945, the hydronephrosis on the right had definitely increased.

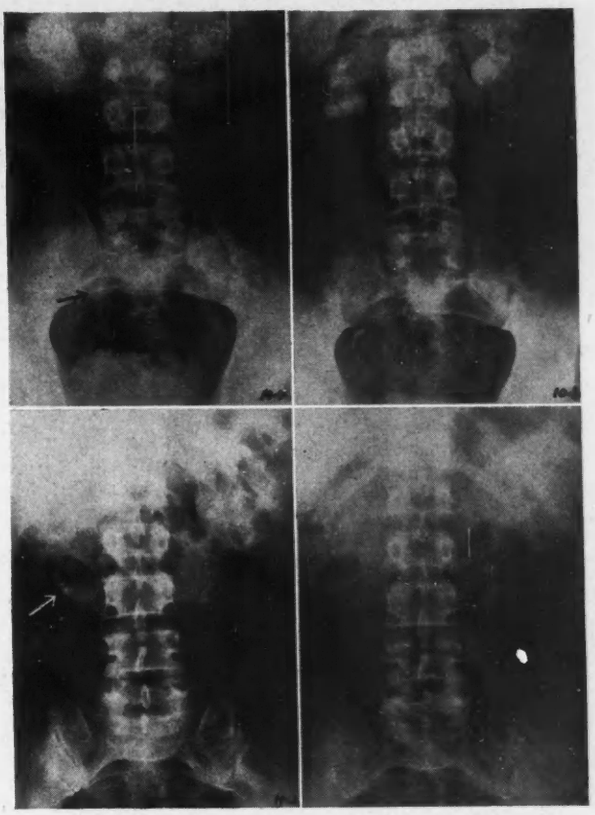
On December 18, the stone was removed by a right muscle-splitting incision. The patient had an uneventful recovery and the wound healed well. A re-check intravenous pyelogram on January 8, 1946 showed the dilatation of the calyces and pelvis on the right had greatly diminished and the kidney was functioning normally (Fig. 10-b).

In cases where the ureter is completely obstructed by a calculus the renal function ceases rapidly. This change is permanent as illustrated by the following case:

CASE 4

R.H., aged 35, was treated for pyelitis, nephro-lithiasis and uræmia in other hospitals since January, 1943, but was admitted to the Montreal Military Hospital on November 13, 1945. He lost 15 pounds in two weeks, and had pain in the right loin for three days. An intravenous pyelogram was carried out on November 22 but no secretion was noted on the right even after three hours. Instead, a large calculus was situated near the right transverse process of L3 (Fig. 11-a).

On December 14 a right pyelolithotomy was carried out. The surgeon found a marked hydronephrosis on the right. The calculus was removed. An I.V.P. on January 8, 1946, did not reveal a calculus in the right ureter, but even two hours after the injection of the dye the right kidney failed to secrete. On January 14,



Figs. 10-a and 10-b. (Case 3).—Plate a 60 minutes after intravenous injection of dye. Note well defined calculus in right ureter at the pelvic brim. Dilatation of right minor and major calyces and pelvis is obvious. In the original plate the dye in the ureter could be seen above the calculus, but not below. Plate b is a 30-minute plate three weeks after the removal of dye. Note now the normal appearance of the collecting system on the right. The transit through the right ureter is good. **Figs. 11-a and 11-b.** (Case 4).—Plate a sixty minutes after injection of dye. Note calculus along course of right ureter opposite L3. No excretion of dye visible on the right due to loss of kidney function after complete ureteral obstruction. Plate b is a two-hour plate taken four months after removal of the calculus in the right ureter. Note complete absence of excretion of dye on the right. Kidney function has not recovered, because the ureteral block was complete and was relieved too late.

a retrograde pyelogram demonstrated a large dye-containing pocket at the site of the right kidney. An I.V.P. on April 23, showed no improvement in the excretion. The function of the right kidney was lost (Fig. 11-b).

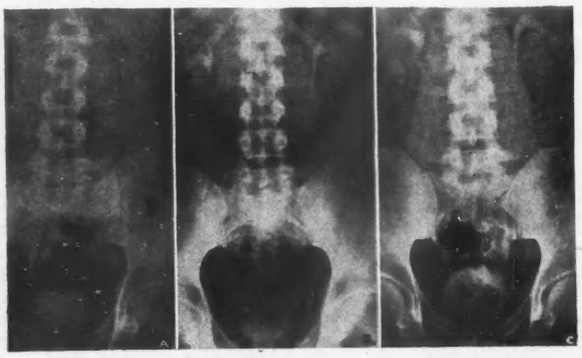
In the early stage of the obstruction the pain may alter in its intensity. It may gradually decrease or even suddenly disappear. This alteration is significant of two different and opposite resulting effects, which must be carefully understood and promptly acted upon.

If a patient claims that his pain is decreasing or is disappearing it means, in the majority of cases, that the obstruction has decreased. The urine is flowing much more freely and the calculus may even be progressing towards the bladder. To ascertain this fact repeated intravenous urographies are indicated. We emphasize this point as the intravenous pyelogram is the best indicator of the progress of the obstruction. The following case history illustrates this observation:

CASE 5

R.J., aged 37, was suddenly seized with a severe colicky pain on Ocober 5, 1945. This pain radiated from the back to the scrotum. Extreme tenderness was elicited in the right costo-lumbar region. A flat plate of the abdomen revealed a questionable opacity along the course of the right lower ureter. An intravenous pyelogram on October 7, revealed a stasis of 1 hr. 50 min. and definitely localized the obstruction to the right lower ureter (Fig. 12-a). A day later the patient was cystoscoped, the right ureter was catheterized and dilated, but the calculus was not engaged. In the following days the pain had diminished and a re-check I.V.P. on October 18, revealed a small opacity at the right ureterovesical junction, but the kidney function was good on both sides. There was still a stasis of fifteen minutes on the right (Fig. 12-b).

In the last days of October, the pain had almost completely disappeared, an occasional dull ache remained. The calculus was not passed. On November 2, the patient, being a member of the staff of the hospital, was discharged to duty. There was no important pain present and a re-check I.V.P. done on November 8, 1945, revealed that the stone was still present at the ureterovesical junction with only 5 minutes' stasis of the dye (Fig. 12-c). The patient passed the calculus spontaneously two days later.



Figs. 12-a, 12-b and 12-c. (Case 5).—Decreasing ureteral obstruction. Plate a 1 hour 50 minutes, after intravenous injection of dye. Note stasis of dye above calculus at lower end of right ureter. The dye on the left has come and gone. Plate b is a fifteen-minute plate taken two weeks later. The calculus can still be seen at the lower end of the right ureter. However there is only a 15-minute stasis now, and the patient has only vague pains. Note how favourably the right collecting system compares with the left. Plate c is a five-minute plate taken four weeks later. There is a normal collecting system on the right. The stasis is now seen five minutes after injection of dye. The patient had no pain and the stone passed spontaneously two days later.

On the other hand, the disappearance of the pain may mean, in some cases, that the obstruction has increased and has become more complete causing an alteration and even destruction of the renal function as illustrated by Case 4 and Figs. 11-a and 11-b. In this case, the pain had disappeared after gradual loss of the renal function. This can all be prevented by the urologist, if we remember to follow up all cases of ureteral obstruction with periodic intravenous pyelograms to determine the kidney function.

It has been mentioned frequently that the early caliectasis is indicative of a low ureteral obstruction. We do not believe in this theory. The dilatation of the calices and kidney pelves will be seen as well in cases presenting a high or a low obstruction. We have observed this fact repeatedly in our series of cases. We do believe however, that the level of the obstruction has a great influence on the future function of the kidney and the treatment to be applied.

The urologist must be "on the alert" if the ureteral obstruction is found at the ureteropelvic junction. Repeated intravenous urographies must be done to follow the progress of the stone or to evaluate the meaning of any change in the pain suffered by the patient. The high ureteral obstruction which shows a tendency to be stationary or causes a stasis in the renal excretion must be relieved. On the contrary, the urologist must refrain from interfering surgically in cases where the calculus has been localized in the lower ureter, and where the stasis is becoming shorter as demonstrated by repeated intravenous pyelograms. For in the latter cases the stone is usually passed spontaneously.

After the stone has been passed or the obstruction relieved, it is recommended to do a re-check intravenous pyelogram in the following days to establish definitely whether the kidney function has returned to normal. It is interesting to note how fast the kidney

function is restored after the obstruction is relieved.

This functional test is also applicable to other abdominal conditions which will be discussed in detail in a subsequent article.

SUMMARY

The extended application of intravenous urography has been employed for accurate determination and exact localization of ureteral obstruction.

The radiological signs significant of ureteral obstruction have been described in detail and they consist of: (*a*) The early radiological evidence of ureteral block. (*b*) The impregnation of the renal parenchyma. (*c*) The stasis. (*d*) Reverse visualization of the collecting system.

The early localization of ureteral obstruction has been shown to be most important if the kidney function is to be saved.

To determine the residual renal function in cases of ureteral obstruction repeated intravenous urographies are strongly recommended. If the stasis is getting less, surgical intervention should be withheld. However, if the stasis is increasing the ureteral obstruction must be relieved as soon as possible if the kidney is to be saved.

CONCLUSION

A method of radiological localization of ureteral obstruction by means of the intravenous pyelogram has been described. The roentgenological signs whereby such obstruction, be it opaque or non-opaque, may be recognized and accurately localized have been discussed in detail. The localization and relief of this obstruction is most important and must not be neglected if the kidney function is to be saved. The intravenous pyelogram is the best and easiest method to ascertain *individual* kidney function.

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ALLOXAN DIABETES*

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THE intravenous injection of alloxan‡ induces a triphasic modification of the blood sugar level; (*a*) initial hyperglycæmia; (*b*) secondary hypoglycæmia; and (*c*) final hyperglycæmia.

The liver is essential for the initial hyperglycæmia since this does not appear in hepatectomized dogs[11, 12] or toads[9] or in eviscerated dogs.[11, 12] The initial hyperglycæmia was observed in dogs after splanchnicectomy[11, 12] in adrenalectomized dogs[11, 12] or toads[9] but not in adrenalectomized rats.[12] In the dog the injection of alloxan produces a rise in blood pressure which is not due to the liberation of adrenaline as shown by suprareno-jugular anastomosis (Houssay and Rapela, unpublished data).

The secondary hypoglycæmia is not due to the liberation of insulin, but to an extrapancreatic effect; probably lack of glucose production by the liver. It is observed in dogs which have been pancreatectomized 30 minutes before the injection of alloxan, but not, or seldom, in those pancreatectomized 24 hours or more previously[11, 12] (Table I). Alloxan produces the secondary hypoglycæmia also in pancreatectomized toads and lessens the diabetogenic action of the hypophysis in hypophysectomized-pancreatectomized toads.[9] In hypophysectomized or adrenalectomized rats the secondary hypoglycæmia is very pronounced and may be counteracted by the administration of adrenocortical extract (Martinez, unpublished data).

The final hyperglycæmia is mainly due to the selective destruction of the beta cells of the islets of Langerhans. The pancreas thus damaged secretes very little or no insulin, as may be shown by grafting it into the neck of diabetic dogs.

In the rat and the rabbit a coagulation necrosis of the beta cells may be observed. In the dog there is degranulation, nuclear alterations and gradual destruction. The beta cells diminish in number from the 4th day; only 50% are to be found at about the 8th day and later on they are still more scarce. At the end

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† Charles Mickle Fellow 1946. Institute of Physiology, Faculty of Medical Sciences, Buenos Aires.

‡ The ureide of mesoxalic acid.

TABLE I.

BLOOD SUGAR CHANGES (MGM./100 C.C.) PRODUCED BY INTRAVENOUS INJECTION OF ALLOXAN INTO PANCREATECTOMIZED CHLORALOSED DOGS

Weight (kg.)	*Time (hours)* 0	½	1	2	3	4	5	6	*Survival-time (hours)*
Pancreatectomized ½ hour before—Alloxan injected									
10.0	95	86	72	63	50	50	..	..	4½
7.5	96	78	69	51	53	28	..	..	5
10.0	94	128	119	100	87	..	87	85	..
7.0	106	102	115	115	84	79	79	81	..
4.5	83	72	50	40	..	43	58	52	..
5.2	82	110	93	52	48	32	24	..	6
7.9	126	154	159	150	97	57	34	48	..
6.8	62	64	81	56	52	52	44	34	..
6.9	72	82	163	164	115	83	65	..	..
Pancreatectomized ½ hour before—No Alloxan									
13.0	78	69	100	114	158	180	185	180	..
13.0	87	78	78	103	103	140	131	149	..
..	82	70	72	108	126	148	158	166	..
..	91	76	78	116	132	156	168	176	..
Pancreatectomized 24 hours before—Alloxan injected									
9.2	260	313	345	369	..	419	..	471	..
9.0	222	228	260	266	260	280	284	294	..
9.0	241	219	294	367	370	373	382	382	..
..	240	..	236	284	320	340	362	378	..
5.8	217	199	189	182	182	168	134	136	..
5.6	245	232	241	296	304	321	376	439	..

of 1 to 6 months only 1 to 4 beta cells are found in each islet, while the alpha-cells persist and even increase in number. In the rat there is an early regeneration of insular cells due to mitosis of centroacinous cells or of those of the wall of the small ducts.

The exocrine tissue of the pancreas is not always undamaged. In 22% of the diabetic dogs which die, fatty necrosis is found (25 out of 111 cases;[1, 7] Figs. 1 and 2). In the lungs congestive or ecchymotic patches are frequently observed; with high doses (100 to 200 mgm./kg.) acute pulmonary œdema is sometimes produced. In the liver there is fatty infiltration and some cellular lesions (Fig. 3). If the dose is a high one (100 to 200 mgm./kg.) centro-lobular or massive necrosis and hepatosis with icterus and diminution of plasma prothrombin may be produced. In dogs which have been diabetic for more than 40 days there is always a marked fatty degeneration of the centrolobular cells.

In the kidney there is glomerular congestion and lesions of the cells of the convoluted tubules and Henle's loop (albuminous degeneration, fatty infiltration and glycogen deposits). If the dose is a high one (75 to 100 mgm./kg.) coagulation necrosis is produced, similar to that due to mercurial salts, in which case the dogs die with uræmic diabetes. With smaller doses (50 mgm./kg.) there is an increase in the blood non-protein nitrogen, which is transitory if the

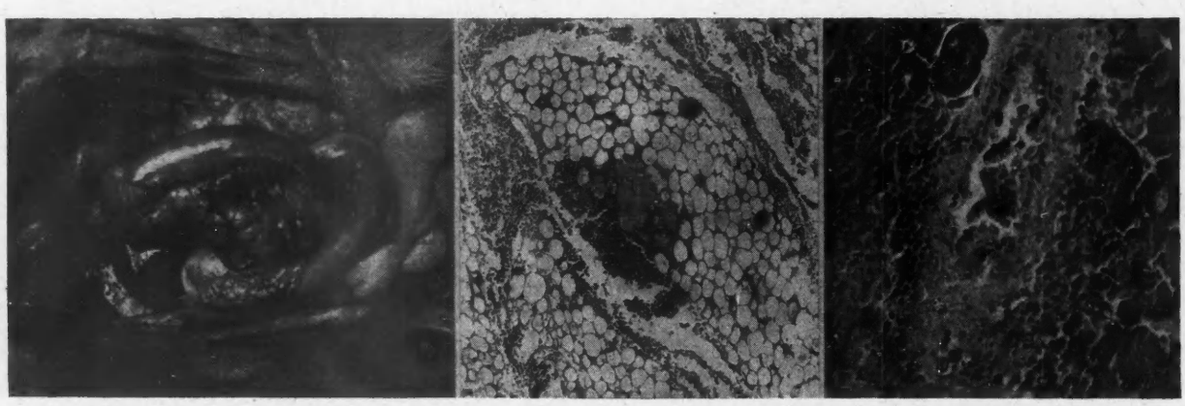

Fig. 1 Fig. 2a Fig. 2b

Fig. 1.—Fatty necrosis on pancreas, mesentery and kidney perirenal fat, after injection of alloxan in the dog. **Fig. 2a.**—Interlobular fatty necrosis of dog pancreas after alloxan; infiltration of small cells. **Fig. 2b.**—Necrosis of the wall of a pancreatic duct after alloxan, dog.

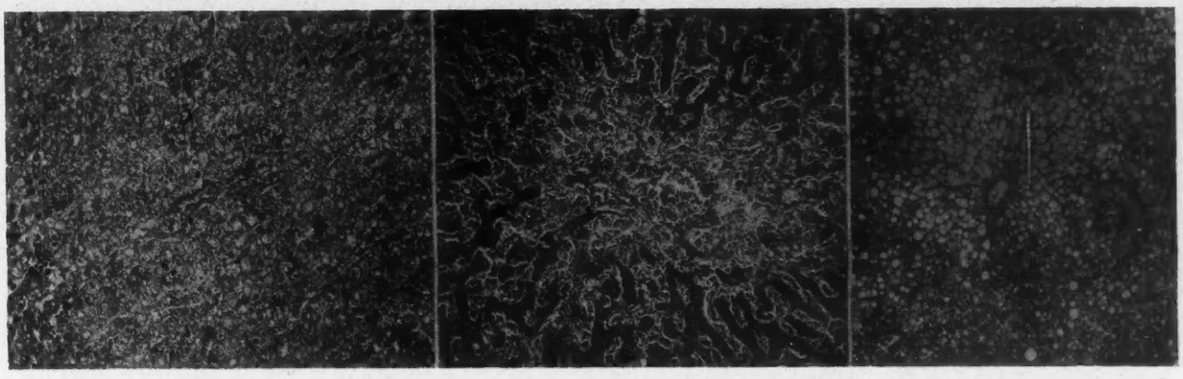

Fig. 3 Fig. 3a Fig. 3b

Hepatic lesions after alloxan in dog. **Fig. 3.**—After 48 hours: acute lesions, fatty infiltration, pyknosis, and some centrolobular necrosis. **Fig. 3a.**—After 8 days: congestion centrolobular necrosis. **Fig. 3b.**—After 248 days: centrolobular and mediozonal fatty degeneration.

dogs survive, but which may increase until the dogs die in uræmia in about 5 to 8 days.

The initial lesions of the lung, liver and kidney may be transitory and reversible. The diabetes is transitory or permanent; the transitory form is more frequent when small doses are given (Table IIa).

TABLE IIa
TRANSIENT DIABETES WITH DIFFERENT DOSES OF ALLOXAN IN THE DOG

	Transient diabetes in relation to permanent		*Permanent diabetes in relation to total number of dogs injected*	
Dose mgm./kg.	*No. of animals*	*% diabetic*	*No. of animals*	*%*
40	5/16	31	16/35	45
50	3/70	4	70/89	78
75	0/28	0	28/30	93

TABLE IIb
INCREASED RESISTANCE AFTER INCREASING WEEKLY DOSES OF ALLOXAN IN THE DOG

		Permanent diabetes in relation to total number of dogs injected	
Week No.	*Dose (mgm./kg.)*	*No. of animals*	*% diabetic*
1	30	0/12	0
2	40	0/12	0
3	50	0/12	0
4	75	3/12	25
5	100	2/8	25

The action of alloxan is rapid and depends on its reaching a sufficient concentration in the blood. As it disappears rapidly the rate of injection is very important. It is better to inject into the saphenous vein rather than into the jugular vein as acute pulmonary œdema is thus frequently avoided. In the dog a dose of 100 to 200 mgm./kg. produces death by acute pulmonary œdema, acute hepatosis with jaundice or uræmic diabetes. With 75 mgm./kg. the majority of the animals die with uræmic diabetes. The most favourable dose is 50 mgm./kg. (0.2 c.c. of a 1% solution per kg. per second; Table IIa). A partial resection of the pancreas (6/7 of its mass) does not increase the sensitivity of dogs to the diabetogenic action of alloxan, while making them very sensitive to the diabetogenic action of anterohypophysis or thyroid, which produce diabetes by a different mechanism (Table III).

The diabetogenic action of alloxan is not modified in dogs deprived of adrenal medulla, thyroids or parathyroids; or in dogs in hypoglycæmia caused by insulin or phloridzin; or in hyperglycæmia caused by the administration of glucose. Many animals die in the first week following the injection of alloxan; with 50 mgm./kg. a greater number survive than with higher doses. Among 170 dogs 35 survived from 8 to 240 days.

Accumulation of effects may be observed in various species. In the dog a single dose of 40 mgm./kg. provokes diabetes in 35 to 45% of cases; but if this dose is repeated during 3 to 10 consecutive days most of the dogs will become diabetic;[7] on the other hand resistance to the drug is produced if increasing doses (30, 40, 50, 75, 100 mgm./kg.) are injected once a week[7] (Table IIb).

Diabetes appears very soon; with a single injection it appears in the dog after one day (60%) or two days (24%). Its onset is later when caused by reinjection of smaller doses. A transitory diabetes is observed with small doses and rarely with higher doses. Diabetes is,

TABLE III.

DIABETOGENIC DOSE OF ALLOXAN IN DOGS: CONTROLS (INTACT PANCREAS) OR PARTIALLY PANCREATECTOMIZED (PANCREAS REDUCED TO 1/7)

Alloxan mgm./kg.	*Dogs*	*Permanent diabetes*	*Transient diabetes*	*No diabetes*	*% of diabetes*
75	Controls	13	0	1	93
75	Pancreatectomized	11	0	0	100
50	Controls	19	3	7	65
50	Pancreatectomized	7	1	3	64
40	Controls	3	0	8	28
40	Pancreatectomized	4	2	9	27

at the beginning, of moderate intensity (Table IV), but becomes gradually more severe, being at the end of severity comparable to the diabetes due to pancreatectomy.[7]

TABLE IV.

AVERAGE VALUES IN META-ALLOXANIC DIABETES

Blood sugar mgm./100 c.c.	180-450
Glycosuria gm./kg./day	0.9-2.8
Urinary N gm./kg./day	0.4-1.3
G/N quotient	2-2.7
Ketone bodies mgm./kg./day	10-50 to 210

Intravenous glucose tolerance curves are of the diabetic type in the dog.[7] In the rat with alloxan diabetes glucose given by stomach tube produces a higher hyperglycæmia and less glycogen deposit in the liver and muscles than in the controls[10] (Fig. 4). The rate of intestinal absorption of glucose is increased during diabetes and becomes normal when the blood sugar returns to normal (Penhos, unpublished experiments in rats).

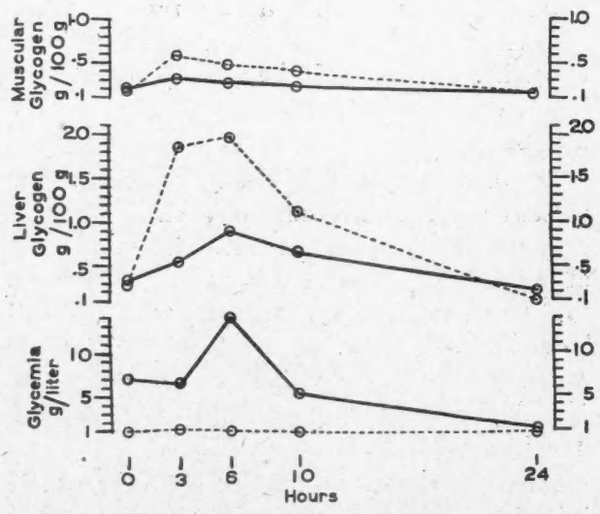

Fig. 4.—Modifications of blood sugar, liver glycogen and muscle glycogen of normal rats (o- - -o) and rats after 48 hours injection of alloxan (o——o) 160 mgm./kg. —— Ingestion of glucose (6 gm./kg.) at 0 hour after 15 hours of fasting. —— Each number is the average of 5 rats. (Houssay, B. A. and Mazzocco, P.)

Alloxan produces a transitory increase in metabolism whether it produces diabetes or not. If the animal remains in hyperglycæmia an increase in metabolism is observed when the diabetes is severe.[7] Coincident with the hyperglycæmia an increase of inorganic phosphorus in plasma occurs. Hepatectomy produces, as in any other type of diabetes, a rapid fall of blood sugar. In only two cases the fall was slow.[7] As the lesions of the beta cells are rapidly produced, only in a few dogs was it possible to cure the diabetes by daily injections of insulin or phloridzin during some weeks (Table V), and this only if treatment was begun promptly. When treatment was delayed for a few weeks, insulin controlled the hyperglycæmia but did not cure the diabetes.

TABLE V.

THE AMELIORATION OF ALLOXAN-DIABETES BY PRECOCIOUS TREATMENT

No. of dogs	18	23
Precocious treatment with	Phloridzin	Insulin
Dead	12	14
Cured	4	3
Not cured	2	4

As originally found by Carrasco-Formiguera we have confirmed that thyroid administration causes diabetes in dogs with islet lesions produced by recent injections of alloxan and transitory hyperglycæmia;[7] but it does not cause diabetes in those in which alloxan has not produced hyperglycæmia nor islet lesions (Table VI).

TABLE VI.

DIABETES BY THYROID TREATMENT AFTER THE ACTION OF ALLOXAN IN THE DOG

	No diabetes	*Diabetes*
Without previous transient alloxen diabetes	5	0
With transient alloxan diabetes...	0	5
(With 1, 1, 1, 2, 4 treatments with thyroid)		

The effect of previous diet has been studied in the rat by Martinez.[15] A diet rich in lard diminishes greatly the resistance to alloxan, a defect which can be corrected by the addition of methionine or thiouracil but not by choline. Some fats (olive oil, butter) have little effect, while others increase the resistance (oleomargarine, corn and especially cocoanut oil).

The endocrine system is important. In the rat thyroidectomy increases definitely the resistance to alloxan,[13, 14] and thiouracil has an even greater effect than thyroidectomy.[17] In thyroid feeding experiments the resistance is diminished at the 20th day and increased at the 60th day. In the dog thyroidectomy did not modify meta-alloxanic diabetes.[7] Adrenalectomy diminishes the resistance to alloxan in the rat (Martinez, De Majo) and the dog; in the former it causes a marked secondary hypoglycæmia. In the dog with meta-alloxanic diabetes adrenalectomy is followed by a rapid decrease of the blood sugar to normal or subnormal levels. After alloxan injections there is a decrease of adrenalin, ascorbic acid and cholesterol of the adrenals (De Majo).

Alloxan produces a more marked secondary hypoglycæmia in female than in male rats (Martinez). Subtotal pancreatectomy does not modify the resistance of the dog to alloxan[7] but increases it in the rat.[19] This effect is possibly due to modification of the beta cells of the pancreatic remnant or to an increased resistance of the newly formed beta cells.

Alloxan injection in high doses diminishes the diabetogenic action of the hypophysis in the toad[9] but not in the rat.[8] In the latter only the gonadotrophic action is diminished while the other actions are not modified (growth, thyrotrophic, adrenotrophic). Alloxan is a toxic substance with multiple initial actions (liver, kidney, pancreas and sometimes lungs). These lesions may be transitory and reversible if the animal survives, except in the pancreatic islets where they are irreversible. The selective destruction of the beta cells which accompanies diabetes is a proof that these cells secrete insulin. A very interesting type of experimental diabetes is produced, characterized by its evolution and by the conservation of the alpha cells and of the exocrine pancreatic tissue.

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NOTES ON CHOLECYSTECTOMY

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THE item of cholecystetomy seems to merit more than average consideration both from the standpoint of decision for or against operation, and of technique. The latter problem is discussed very briefly in this paper.

THE INCISION

A transverse incision, in our experience, gives the best exposure unless the patient has a very acute costal angle. Such an abdomen should be entered through a vertical incision. This is best placed at least 3 cm. from the midline so that a large piece of fascia is available for closure. After the anterior rectus sheath has been separated from the muscle at the transverse attachments and the corresponding vessels ligated, the muscle is displaced laterally. The skin towels are sutured to the fascia (anterior rectus sheath) before the peritoneum and transversus structures are incised. The length of the skin incision is longer than that in the rectus sheath, which in turn is longer than the opening in the transversalis and peritoneum. The fascia and peritoneal incision should never be longer than the skin. This predisposes to inadequate and unsatisfactory suturing. Neither should the muscles be separated by pulling and tearing the fibres apart. Good healing and painless wounds are dependent upon minimum trauma and sharp knife dissection.

The transverse incision starts approximately half way between the umbilicus and the

xiphoid, a little to the left of the midline. The position of the incision varies with the location of the liver edge and gallbladder. It runs almost straight out to just below the outer rib margin. The fascial incision is started at the midline (linea alba) and continued to the lateral edge of the rectus sheath. At this outer angle of the wound the incision is not carried down directly under the skin incision but each oblique is separated in the direction of their respective fibres. A "straight cut" at this end of the incision makes for bleeding and a non-anatomical repair. The nerve should be saved if possible but can be cut without serious results. The thick lateral edge of the rectus sheath is cut and the muscle raised from the floor by the first finger of the left hand inserted from the lateral side. The muscle is cut through slowly. Each vessel is caught separately and often a vessel is clearly seen and grasped between forceps before it is cut. Bleeding is thus easily controlled. The direction of the fibres in the transversus is, of course, transverse, so the opening of the peritoneum and transversus is made in the same direction as the skin incision to the lateral end of the wound.

The incision of the anterior sheath of the left rectus is sometimes beneficial by allowing more retraction and better exposure in a deep wound. There should be no hesitation in extending the inner end of the incision upward if necessary.

EXPLORATION (DECISION OF OPERATION)

A complete exploration of the abdominal contents should always be done unless a contra-indication exists. It proves or disproves the diagnosis and gives valuable other information. The biliary area is examined last. Not until the general exploration has been completed and the biliary area well inspected, can the symptoms be correlated with the pathological condition found, and the type of operation decided upon. This, of course, demands a good history. The success of the operation varies directly as the good judgment used, and judgment cannot be good if all the facts are not known. Technique may be considered, all things being equal, of secondary importance. Judgment, in or out of the operating room, is of primary importance. However, in no area of the abdomen may technique be, on occasion, so difficult and the operation so trying, as in this location. Judgment must be tempered by technical ability. The exact type of operation should not, therefore, be definitely decided upon before the abdomen is opened and inspected. A preoperative decision, if unchanged after opening the abdomen, may be disastrous.

PREPARATION OF OPERATING FIELD

Working conditions are greatly determined by this preparation in conjunction with assistance, retraction, and the location and size of the incision. If the gallbladder "elevator" is to be used it should be raised at this point. Sometimes it is helpful. (A small pillow under the lumbar curve will prevent many postoperative sore backs which are often blamed on the spinal anæsthetic.) The field of operation cannot be prepared until the type and extent of the operation is known. It is a mistake to start "packing off" before the preoperative and expected plan of attack has been proved right or wrong. If the operator stands on the patient's left side, there is often a clearer and less strained view. Packs moistened in normal saline instead of sterile water are much less irritating to serosal surfaces. If carefully placed they take up very little space.

One large pack, as used for resections of the distal large bowel, is often the most satisfactory. Before this is placed, sharp and clean knife dissection is often necessary to free the bladder (separation dissection is preferable in the ductal area). One end of the pack is placed at the outer end of the transverse colon and is then reflected on to the pylorus and stomach. The first part, and the upper half of the second part, of the duodenum are thus partly left in the field. This structure can be better handled separately by a small pack, or even by the fingers alone, when the ductal junction is being dissected. If the ligamentum teres and the falciform ligament have to be severed they should be repaired. The liver is held up by placing a bendable flat retractor under it, in such a way that trauma is minimal. If the surgeon is working on the right side of the patient, this requires a retracting assistant at his left elbow. Manual retraction should be used whenever possible. It is more flexible, more easily placed, the position more readily changed, and it is less traumatic to the viscera as well as the abdominal wall. Retraction should be intermittently relaxed. If the wound is well placed, and large, the extra space required for the retracting hand is not too much, and if the space lost is great, the better retrac-

tion should more than make adequate compensation. However, mechanical retractors are often preferred.

This plan provides packing and retraction for the perimeter of the operating field, but does not prevent blood or bile from trickling into the lesser sac. This is prevented by placing a long saline-soaked piece of gauze in the foramen of Winslow (palpation of the common duct will have been done during the latter part of the abdominal inspection and will have helped to determine whether the common duct should be opened). Deeper, more inward, downward and medial retracting is necessary for common duct manœuvres. For this the hand is ideal. The fingers act as several small retractors and are able to put structures on tension, relax them, spread them apart easily, quickly, and conveniently. The left hand of the assistant on the other side of the table or the right hand of an assistant at the surgeon's right elbow thus can, like the anæsthetist, be of the greatest assistance. Either can help to make a difficult operation easier, or make an easy operation difficult.

CHOLECYSTECTOMY

Because the entire extra-hepatic biliary system is always potentially associated with pre- and postoperative symptoms, the examination of the common duct is an integral part of cholecystectomy. And because the cystic duct is always intubated with a very small Robinson catheter (F. 6) when the gallbladder is removed and the common duct not opened, *it is always necessary to see the ductal area clearly.* In addition, when one considers the possibilities of injuring a large duct, of losing a bleeding vessel, or of cutting a vital structure (anomalous or normal) *the clear, complete, and unobstructed view of the ductal area becomes absolutely imperative.* Emptying the bladder by trocar is sometimes beneficial in this regard. *No structure should be severed until it is definitely identified and seen clearly on all sides.*

Removal is usually started at the ductal junction. The cystic artery should first be tied, if possible before branching. This reduces bleeding and the number of clamps in the wound. *Great respect must be shown here to every structure, no matter how obvious the anatomy may appear.* One should assume that there is no normal arrangement of vessels and ducts in this area. The cystic artery should be clearly visualized. It is not clamped. It is tied directly. A tie is much more secure if applied to an uninjured wall. It also allows a larger and safer "cuff" to remain distal to the tie. Tying the cystic artery will not always stop further bleeding but will reduce it greatly. Further bleeding depends upon the removal from the liver bed, and a possible extra artery or untied branch. The tie on the cystic artery must satisfy the operator before proceeding further. Bleeding from this vessel when it retracts behind the common hepatic duct may be severe and frightening. Groping and blind grasping must never be done. This is the common way of injuring the duct. The bleeding can be quickly and easily controlled by pressure between the first finger of the left hand in the foramen, and the thumb of the same hand above the hepato-duodenal ligament. This manœuvre is also very helpful if the liver accidentally causes severe hæmorrhage. Clamps without teeth should always be used in this area.

The cystic duct is incised transversely through 90% of its lumen, about 10 to 15 mm. from its termination, and a very small catheter (size F. 6 or 8) inserted for 2 to 3 cm. into the large bile duct. The remaining posterior part of the duct is used for traction, thus allowing easier entrance of the catheter. After this has been secured and the "water-tightness" tested by syringe, the duct is completely severed and the removal continued. Care must be taken that the tie does not occlude the lumen of the tube or impinge upon the common duct. The catheter is retroperitonealized in the bed of the bladder after its removal, and is used for postoperative x-ray studies of the ductal system. All operative patients have this study made. It is of the greatest value postoperatively. The catheter may also be used for drainage, for the administration of necessary fluids postoperatively, and for the calculus solvents (with which we have never had any good results). Dissection keeps close to the cystic duct and away from the large ducts. It is in this area that the normal positioned right hepatic artery or an anomalous vessel or duct may be cut. Inflammatory reaction may also have distorted the common hepatic duct. Separation pressure dissection is therefore best suited for this part of the operation. Being slow, gentle, and careful is a worthwhile

fault in this location. *A structure must never be incised until it is identified definitely.*

As the under surface of the liver is approached a wide flap of peritoneum is saved on either side of the liver bed for peritonealizing. The raw fossa should not be left bare. This is an invitation to other structures, especially the duodenum and the pylorus, to become adherent to it. The incision through the gallbladder serosa is made at varying distances from the liver and is dependent upon the pathology present. Often a "line of cleavage" is found, but extensive disease may obscure this. It is then better to leave some thickness of gallbladder wall in the liver bed. This should not be of much consequence if all the mucosa is removed. In all but the acute and subacute cases, the removal of the gallbladder from the liver should present no difficulty if removal is not made too close to the liver substance. It is simply a matter of being careful and deliberate, but *sufficient working space is essential.* Tears in the liver are usually avoidable. They may give bothersome bleeding. They are best controlled with a figure of 8 interrupted, or overrunning, suture, using very fine material. Coagulating fluids and gauzes have recently been quite satisfactory for the control of troublesome oozing. The tube, as it leaves the cystic duct, should also be covered with peritoneum or omentum to prevent adhesive reaction around the common duct area. Liver biopsies from the right and left lobe of the liver are taken in every case.

INSPECTION

The working field must be left as anatomically normal as possible. Small bleeding points should not be left on the theory that they will soon stop. A small cigarette drain may be inserted on occasion to the pouch of Morrison or the foramen, and brought out through a separate stab wound. Every case is an individual decision but the writer never uses a drain unless it is going to serve a real purpose. In some instances if peritonealization is difficult, it is wise to place the greater omentum against the under surface of the liver so that the intestines are protected from adhesive areas.

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CLOSURE

The closure is a very important part of the operation and if an evisceration occurs, it may be the most important part. The peritoneum is sutured with No. 1 plain catgut. Failure to include the transversalis structures weakens the wall. The sutures are placed close together with a minimum of tension. In the transverse incision the rectus muscle is usually not sutured. The fascia is repaired with interrupted wire, silk, or No. 1 chromic catgut, single strand. In the transverse incision the pull of the suture is at right angles to the fibres and is, therefore, not so likely to pull out. If the incision is hard to bring together, a suture is placed at each end of the incision, alternately. Thus the tension is reduced slowly from the ends where it is the least, and the middle of the wound is the last to be sewn. This is rarely necessary. Sutures must not be tied tightly. Their function is to hold structure to structure until healing is well advanced. Tight ties and sutures which tear out or strangle the blood supply, defeat their purpose and predispose to disruption. Dead space in the subcutaneous tissue should be killed by approximation with 5-0 plain catgut. The skin is held together with No. 1 plain catgut, sewn in the over and under fashion, or by longitudinal subcutaneous wire (Coller). The latter is better and is pulled out in 8 to 10 days so no suture material remains in the wound. One double piece of gauze is sufficient to cover the wound. Postoperative heat to the abdomen is very beneficial but is of little value if the skin is covered by large pads and adhesive. Dressings are not done unless blood or bile are leaking, or there is an infection. Postoperative care starts with the insertion of the last suture. Only if it is careful, thoughtfully physiological, and continuous, will recovery be optimum and uneventful.

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MUCOSAL RESPIRATORY (Stevens-Johnson) SYNDROME

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A CONSIDERABLE amount of medical literature has been devoted to new syndromes known variously as erythema exudativum multiforme;[1, 14] Stevens-Johnson syndrome;[4] Behcet syndrome;[5, 6] ectodermosis erosiva pluriorificialis;[10] cutaneous fever;[8] mucosal respiratory syndrome;[4] and ulceromembranous stomatitis.[15]

I feel that the various clinical pictures, described under this multiplicity of names, represent a single multi-faceted syndrome with a large variety and number of signs and symptoms. Whether this syndrome actually exists *sui generis*, or whether it is merely a coincidental grouping of individual diseases remains to be seen. There is certainly insufficient evidence to call this picture a disease. It must be considered, as yet, a syndrome.

CLINICAL ASPECTS

The diagnostic criteria of this syndrome are loose, as shown in the many reported cases. In general, the clinical picture consists of a severe debilitating illness, with marked toxicity. The enanthem features are more marked than the exanthem. The physical findings are often out of proportion to the apparent illness; improvement is by lysis. In contradistinction, Behcet[5] has emphasized the absence of fever or constitutional symptoms. This same writer lays considerable emphasis on recurrences.

In particular, the clinical picture consists of involvement of the various bodily mucous membranes and of the skin. The oral mucous membrane is always widely involved. The characteristic process is one of vesicle and bullous formation, followed by sloughing, ulceration, hæmorrhagic tendencies and pseudo-membrane formation.

The genitals are commonly involved. This may vary from a mild urethral lesion, usually similar to the oral lesions described, or to a gross involvement of the penis and scrotum.[5] Ocular involvement[11] occurs in a large proportion of cases. This may be as slight as a photophobia, but is usually a catarrhal or purulent conjunctivitis with blepharitis. The involvement may progress to an iritis, a cyclokeratitis or to a pan ophthalmitis, even proceeding to the loss of an eye.[4, 13, 21]

It is felt that the following case is worthy of record.

CASE REPORT

Able Seaman C.B., aged 20, returned to the base from annual leave on May 22, 1946, with a non-productive cough, a feeling of heaviness across the upper anterior chest, and mild malaise.

On May 31, nasal congestion developed, and a watery nasal discharge, followed by photophobia and painful lachrymation with swelling of the lips and cheeks. On June 3 he was admitted to hospital with a fever and severe malaise. Shortly after admission he complained of a painful mouth and throat with severe dysphagia.

On admission to the ward the patient looked flushed and toxic. His lips were puffy and he was slightly cyanotic. Temperature 100°, pulse 110, respirations 22. There was swelling and redness of both eyelids, conjunctival injection, and marked epiphora, with deposits of thick clear mucoid discharge in all canthi. There was a profuse anterior nasal discharge with marked œdema and reddening of the nasal mucosa.

The mouth revealed gross swelling of the lips and cheeks externally. On internal examination the mucous membrane of lips, buccæ, gingivæ and pharynx were seen to be studded with white vesicles. These varied in size from pinpoint vesicles to bullæ of 1.5 cm. diameter. They were of various shapes. An occasional bulla was hæmorrhagic, and had ruptured leaving a raw surface. The tonsils were slightly swollen and markedly injected. There were palpable non-tender lymph glands of moderate size at both mandibular angles only.

The whole left chest showed signs of decreased air entry, râles of all types and many varied rhonchi, with dullness at the left base. The right chest demonstrated scattered inspiratory rhonchi with varied râles over the middle lobe area.

X-rays of the chest demonstrated a patchy type of parenchymal infiltration extending from the inferior margin of the left clavicle to the base, and a minimal infiltration in the first, second and third right anterior interspaces.

The cardiovascular system was normal, the blood pressure was 104/70. Examination of the nervous system was negative. The penile meatus was very red. The skin was normal.

The leucocyte count was 15,000, the sedimentation rate was 42 mm. and the differential count was 67% neutrophiles, 29% lymphocytes and 4% eosinophiles. Throat swabs showed a normal flora only. Cultures from oral vesicular fluid were sterile. The heterophil antibody and psittacosis antibody agglutination tests were negative. No fungus or yeast bodies were obtained; the Kahn was positive. Cerebro-spinal fluid study and blood culture was negative. Plasma chlorides were low, 280 mgm. %.

Progress notes.—Weakness and toxicity were the predominating features of the clinical picture. This persisted to a severe degree for 14 days, and to a moderate degree for 28 hospital days. The temperature rose to a peak of 101.8° (rectal) on the third hospital day and then gradually subsided by lysis, becoming normal on the 18th day.

On the 3rd hospital day the conjunctivitis became purulent. No pathogens were demonstrable. The blepharo-conjunctivitis had cleared by the 5th day. The nasal passages cleared on the 3rd day.

By the 3rd day, there were no more intact bullæ in the stoma. The whole mucous membrane became a white sloughing mass with raw red areas showing through. There was severe œdema. Some areas became shallow ulcers with hæmorrhagic bases. There were two exacerbations of the stomitis, with final clearing about the 25th day.

On the 3rd day the patient began to produce glairy white sputum. The cough and sputum persisted until the 25th day. The chest was pronounced radiologically

TABLE I.

A SYNOPSIS OF THE CLINICAL FEATURES OF THE CASES OF MUCOSAL RESPIRATORY SYNDROME IN THE CASE RECORDS OF ROYAL CANADIAN NAVAL HOSPITAL, HALIFAX, NOVA SCOTIA

Case	*S-HD. Oct. 20/43*	*G-M.A. Sept. 20/44*	*MCL-R. April 25/46*	*B-RO. June 3/46*
Age	21	19	19	20
Onset	Three days prior to hospitalization.	Two days prior to hospitalization.	Six days.	Ten days of mild symptoms. Two days of severe symptoms.
Symptoms	Sore mouth. Sore eyes.	Sore throat. Heartburn. Cough.	Headache, sore throat. Chills and fever.	Chest cold for 10 days. Malaise, sore mouth, sore throat for 2 days.
Oral lesions	Widespread bullæ with generalized sloughing and superficial ulcer formation.	Diffuse widespread bullous formation with sloughing, ulceration and membrane formation.	Generalized vesicle formation.	See case history. Widespread bullous formation, then sloughing and ulceration.
Eyes	Bilateral conjunctivitis and blepharitis, becoming purulent.	Bilateral conjunctivitis, purulent.	Photophobia for 4 days.	Bilateral conjunctivitis and blepharitis.
Chest	No signs or symptoms. A minimal residual pleuritis at the dome of the right diaphragm on x-ray.	Cough with small amount of sputum. Rhonchi and râles were present. X-ray negative.	No involvement.	Bilateral bronchopneumonia.
Skin	No involvement.	No involvement.	No involvement.	No involvement.
Penis	Meatal inflammation with the formation of white plaques.	Meatal inflammation.	No involvement.	Meatal inflammation. Dysuria—4 days. Retention one day.
Temperature and general appearance	Temp. 101° at height of illness. Normal in 8 days. Patient appeared very toxic and ill.	Temp. 103° at height normal in 9 days. Toxicity was a highlight.	Height of 101° normal in 6 days. The patient was only moderately ill.	Temp. of 102° at height. Normal in 18 days. Patient extremely toxic recovery slow.
Laboratory	W.B.C. — 13,800. Sed. Rate 16 mm. 1 hour. Throat swab light growth of usual flora.	W.B.C. — 22,000. Sed. Rate 18 mm. Sputum and pharynx showed usual flora only.	W.B.C. — 10,000. Sed. Rate 46 mm. Throat swab revealed normal flora only.	W.B.C. — 20,000. Sed. Rate 50 mm. See case history for bacteriological work.
Course	23 days of hospitalization then to duty.	28 days of hospitalization then to duty.	25 days hospitalization including 6 days for dental extractions.	43 days hospitalization. 28 days convalescent leave.
Recurrence	Three previous similar attacks in the past three years.	None.	None.	None.

normal on the 7th day; however, many coarse inspiratory rhonchi were noted for 20 days.

The urethral inflammation reached its height on the 5th day with the formation of a small white ulcer at the meatus. This inflammation had completely subsided by the 8th day. During this period of time dysuria was present. Acute urinary retention was a feature for 24 hours.

The leucocyte count ranged from 15,000 to 20,000 and the sedimentation rate from 30 to 50 mm. for 16 days, then slowly began to subside. They were still slightly elevated on the 36th day. Repeated sputa showed heavy flora, only, for 10 days, and then began to show moderate amounts of atypical pneumococci and hæmolytic streptococci. The Kahn blood test was negative on the 8th day.

Penicillin was used, empirically. In all, 2,680,000 units were administered, by 40,000 unit intramuscular injections q.3h. Calcium penicillin, by means of aerosol administration, was used for 24 hours until the available supply of this substance was used up. The progress of the illness suggests that penicillin was of no avail. The shock, dehydration and low plasma chlorides of the first three hospital days were combated with intravenous therapy consisting of 5% glucose in normal saline and 5% glucose in distilled water. Supportive treatment and careful nursing care were emphasized. A high caloric, high protein, high vitamin fluid was administered by stomach tube for 3 days and following this the patient took a similar mixture by mouth. The administration of 50 mgm. of ascorbic acid daily was followed by improvement in the slowly healing mouth lesions, and Easton's syrup greatly stimulated a very poor appetite.

SUMMARY

1. It is proposed that the clinical pictures described under the labels of erythema exudativum multiforme, Stevens-Johnson syndrome, Behcet syndrome, ectodermosis erosiva pluriorificialis, cutaneous fever and mucosal respiratory syndrome be considered as variations of the same condition.

2. No further attempt at naming the syndrome is made in the belief that this cannot be satisfactorily accomplished until details of the etiology are identified.

3. A case history is presented.

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SKIN TESTS IN DERMATOLOGY*

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THE study and application of allergy in modern dermatology has broadened the knowledge of the pathogenesis and therapeusis of a great many unrelated dermatoses.

In the American school of dermatology, Sulzberger and his co-workers, by their many contributions, have substantially aided in placing[1, 2] dermatologic allergy in a position where its practical applications can be appreciated by general physicians as well as specialists.

By allergy we mean that state of altered reactivity specifically acquired, resulting from exposure to a foreign substance and that is made manifest upon re-exposure to the same or a closely related substance. The alteration in reaction may be in one of two directions, either increased reactivity—hypersensitiveness; or diminished reactivity—hyposensitiveness or even absence of reaction.

The common cutaneous manifestations of allergy where skin tests can be used, are the four main types of dermatologic allergy, namely: (1) Contact allergy. (2) Atopy. (3) Allergy of infection. (4) Drug allergy.

CONTACT ALLERGY

Contact allergy accounts for the greater number of cutaneous problems encountered in practice and it is here that skin tests play their greatest rôle. It is estimated that with the aid of patch tests presently to be described 30 to 50% of all suitable selected cases can be clarified with regard to contact causes. All humans are subject to this form of specific sensitization after adequate exposure. There is no familial predisposition. The epidermis of the skin and mucous membrane is the shock tissue and the allergens, known as contactants, are inorganic and organic non-protein substances: plant oils (ivy, ragweed); plant products (turpentine, pyrethrum, etc.); dyes; cosmetics; anæsthetics (novocaine, benzocaine, etc.); metals and metallic salts. The chief manifestation of contact allergy is contact dermatitis (dermatitis venenata) characterized by erythema, œdema and vesiculation of the affected part. In typical cases there is a predilection for the exposed parts of the body—face, neck, hands and forearms. The eruption is usually limited to the areas exposed. The eruption is inflammatory in nature, usually acute and showing erythema with vesiculation and bullæ and later on papules and diffuse infiltration and even lichenification in long standing cases.

The diagnosis of the causal allergen in a suspected case of contact dermatitis is arrived at by obtaining a complete history, by thorough examination and quite often by the aid of the patch test to confirm it.

1. The localization of the eruption gives a clue; (*a*) localized to wrist: suggests wrist watch or bracelet, etc.; (*b*) localized to face: think of cosmetics or hair dye; (*c*) localized to trunk: underwear, girdle, bathing suit, etc. are to be thought of.

2. Investigate all possible sources of allergens; (*a*) patient's occupation, *e.g.*, dental mechanic exposed to certain amalgams, plasters, etc.; (*b*) avocation—hobbies, photography, etc.; (*c*) environmental contacts such as clothes, cosmetics, jewels, household articles, topical remedies and plants.

3. *Patch test* is used to confirm the diagnosis. Whenever possible it is applied to an area of normal skin adjacent to the affected parts and left on for a period of 24 to 48 hours. If the test is positive an eczematous eruption resembling the original dermatitis appears at the test site.

The method of applying the patch test is as follows: A small square of material (one-quarter inch) snipped from the suspected article or plain cotton, wetted, soaked or in some way holding the liquid, cream, grease, solid or particulate substance is placed on a normal skin area and immediately covered by a half inch square of impermeable material (cellophane). The two pieces are held in place with a still larger square of adhesive tape (or Scotch tape in case of hypersensitivity to adhesive plaster).

* Read at the Seventy-seventh Annual Meeting of the Canadian Medical Association, Banff, Alberta, June, 1946.

In choosing the site for patch testing one selects an area as close as possible to the involved sites. The flexor surface of the forearms is used for dermatitis of the hands and in cases of face involvement the V of the neck. The back, however, is used as a matter of convenience. The reading of the test is graded as follows: 1 plus—erythema; 2 plus—erythema plus infiltration; 3 plus—erythema, infiltration and vesiculation; 4 plus—bullous in character.

In performing patch tests with drugs it is important that the proper dilution or concentration and vehicle be used. There are easily accessible tables.[3]

A reaction is considered significant only if one is certain that the material employed in testing is not a primary irritant: and that the patient has had any opportunity to be exposed to this particular substance giving the reaction, and finally that upon removing that substance the patient recovers.

A negative reaction may occur if we are testing the patient during a phase of desensitization after an acute dermatitis. Also it is possible for the sensitization to be so localized that the application of the allergen on any other area except the involved area may fail to elicit a reaction. Another reason for a negative test in a strongly suspected case may be that it is not possible to reproduce the conditions upon which the eruption occurs, *e.g.*, maceration, sweat and friction contribute to hand sensitization in industrial workers.

The principal practical uses of the patch tests according to Sulzberger and Baer[4] are as follows: (1) To help find the causal allergens in cases of acute, subacute and recurrent allergic contact-type eczematous dermatitis. (2) To help select topical medicaments to which the patient is not allergic. (3) To assist in the differential diagnosis between allergic contact-type eczematous dermatitis and other conditions such as seborrhœic dermatitis, atopic dermatitis, mycotic infection and nummular eczema. (4) To assist in discovering causes of occupational dermatoses and to trace allergenic industrial hazards in plants and in various manufacturing and production processes. (5) To help investigate articles intended for consumer use, for their possible harmful effects on the user. (6) To help in selecting workers most suitable for employment in occupations entailing exposures to substances notorious for producing allergic contact-type dermatitis. (7) Used as a rehabilitatory measure in industry where the causal agent is removed, when the patient is sensitive to only one agent.

In order to avoid serious reactions—local or general flare up—in carrying out patch tests do not test the patient during a phase of acute eruption. Always be sure of the concentration of the substance and if intense itching or burning exists under the patch test, remove the latter at once before the forty-eight hours, to avoid excess local reaction. Also check for the history of a tendency to keloidal scarring.

ATOPY

This is a form of specific hypersensitiveness occurring in man and dependent for its development upon an inherited disposition to react to excitants. The allergens or atopens are the water-soluble protein fractions of food, epidermals or pollens, molds or bacteria. Circulating antibodies known as atopic reagins are often present in the blood. These reagins are transferable and have the property of sensitizing normal skin and this is made up of in the passive transfer or Prausnitz-Kuestner skin tests.

The minute vessels and capillaries of the cutis are the principal "shock tissues" and the cutaneous manifestation is known as atopic eczema or neurodermatitis disseminatus. In infants and children the cutaneous eruption is usually eczematous and Peck[5] has shown that here, patch tests may be used successfully, as the permeability of the skin is sufficient for the penetration of the atopens.

In adults the first manifestation of atopic dermatitis is a papule, followed by lichenification and excoriations as the secondary changes. The sites of predilection in infants are the face, extensor surfaces of forearms, lateral aspects of legs and at times the entire trunk: whereas in older children and adults, the face, sides of neck, cubital and popliteal areas are usually involved, giving the clinical picture of lichenification and excoriations. The standard method of skin testing in atopic eczema are: (1) Scratch tests. (2) Intradermal tests. (3) Passive transfer or Prausnitz-Kuestner (P.-K.) tests.

The characteristic skin reaction to the above tests is an "immediate wheal" and flare, usually reaching its maximum in about five to thirty minutes.

In performing scratch tests the common protein allergens are obtained from commercial firms, either in powder or liquid form and where no commercial extract is available the substance can be used as clinically encountered, provided the primary irritating action and the dangers of serious infections are excluded. A superficial scratch 3 mm. long is made on the skin with the blunt side of the tip of a scalpel, deep enough to incise the epidermis without producing blood. Then one drop of N/20 sodium hydroxide is applied to the scratch site and by means of tooth picks a minute amount of the allergen is transferred to the drop of N/20 sodium hydroxide and mixed for five seconds. A fresh tooth pick is used for each application.

To rule out the tendency of some patients' skin to react with a wheal and flare to the traumatic or chemical effects of the scratch test and solvent used as a control, scratch tests must be performed with the vehicle or solvent but without the allergen. The advantage of using scratch tests lies in the simplicity of the method, stability of the antigens and the comparative unlikelihood of false positive reactions and above all because the danger of anaphylactic shock is minimized since the antigen can be removed should any evidence of a constitutional reaction appear. Although it is reputed to be 30 to 500 times less sensitive than the intradermal technique it is recommended as the safest procedure for general use by the non-specialists.

The results of the wheal and flare reactions are recorded as follows: 1 plus—wheal and/or erythema slightly greater than the control site; 2 plus—wheal 1 cm. in diameter and surrounding erythema with pseudopods; 3 plus—wheal 2 to 3 cm. in diameter with pseudopods or 4 cm. in diameter plus surrounding erythema.

The stronger the local reaction the greater the likelihood of systemic reactions.

Thus in atopic dermatitis skin tests are principally used as an aid in differentiating it from dermatoses that resemble it, such as seborrhœic eczema, parasitic eczema and the non-atopic forms of exfoliative dermatitis.

Secondly, skin testing may prove a useful aid in the management and treatment of atopic dermatitis. However, it must be borne in mind that a positive skin test does not necessarily prove that a particular atopen is an etiologic factor and conversely a negative reaction does not exonerate the atopen. Generally speaking, food plays a more important rôle than inhalants in infancy and in adults inhalants are the most important causal substances.

In urticaria where skin testing would appear to be indicated it is often a failure. Also many of these patients have dermographism and react to any trauma with wheals giving us false reactions. Therefore, accurate histories and elimination procedures are of greater importance than skin tests.

2. The technique for intradermal or intracutaneous test for immediate wheal reaction is as follows: 0.01 to 0.02 c.c. of the urticariogenic allergens in liquid form are injected into the skin as superficially as possible, using a tuberculin syringe and a 27-gauge needle. This method is more sensitive than the scratch method and hence of greater value as an aid to the differential diagnosis of atopic eczema and other forms of eczema. However, one gets a greater number of false positive reactions with this method and there is greater likelihood of constitutional reaction, and a final disadvantage is the relative instability of the atopen.

3. The passive transfer or Prausnitz-Kuestner test is used in cases of extensive eruption where normal skin is not available for skin testing. However, special training and experience is necessary to employ the techniques properly.

ALLERGY OF INFECTION

Allergy of infection or bacterial allergy is a form of altered reactivity of the tissues to living agents and their products (bacteria, fungi, viruses and parasites). Most individuals become specifically sensitized upon adequate exposures. The shock tissue may be any section of skin, but the cutis and follicles are usually affected. Many infectious diseases are believed to be based primarily on an allergic mechanism, especially the tuberculoderms, syphiloderms, mycoderms and leproderms.

Allergy of infection is in some way linked up with the question of resistance and immunity and the skin registers allergic changes in other organs of the body even if the skin itself is not involved in the active process. The antigens used in testing are derived from the infectious agents (specific extracts) and 0.1 c.c. of the antigen is injected intradermally and in some cases the patch or scratch techniques may be used also. Erythema and induration appear at the test sites in 48 to 72 hours if positive.

Specific tests used as diagnostic aids are: (1) Tuberculin tests, the use of quantitative tests with old tuberculin Koch are also employed as an aid in the classification of the tuberculoderms. (2) Trichophytin and oidiomycin tests in cases of fungous diseases. (3) Frei test for lymphogranuloma inguinale with either the mouse brain or chick embryo antigen. (4) Ito-Rienstierna test (ducrey antigens) for chancroid. (5) Brucellergin test for brucellosis. (6) Mallein test for glanders. (7) Lee and Foshay test for tularæmia.

It is important to remember that a positive reaction is not always indicative of disease but may signify that sensitization exists due to past exposure. In syphilis and leprosy the respective tests, luetin and lepromin, because of lack of successful cultures, often produce false reactions and have not proved useful to the general physician.

DRUG ALLERGY

This is a form of specific hypersensitiveness resulting from exposure to medicaments which may be ingested, injected, inhaled or applied externally. The capacity of different people to become sensitized to drugs varies considerably and is not familial. Except in serum reactions circulating antibodies are not present. The "shock tissues" may be any portion of the skin, epidermis, superficial and deep cutis or the follicular apparatus. Drugs that bring about sensitization vary in their chemical structure from complex organic substances like arsphenamine to simple inorganic substances as halogens as well as protein substances (sera).

Skin testing in drug allergy is limited to the patch tests and it is indicated only in the eczematous and acneform type of drug eruptions irrespective of whether the eruption is due to ingestion, inhalation or external contact. As in contact allergy it is important to know the concentration of the drug used for testing and the interpretation of the patch tests is similar. A positive test is significant only if one can then show that there has been opportunity for exposure to the drug and that upon withdrawal of the drug the eruption clears up. A negative test may be due to periods of refractiveness or periods of spontaneous desensitization following the eruption. These may last 8 to 12 weeks.

Drugs usually producing eczematous reactions are quinine, procaine, benzocaine, mercurial and formalin derivatives, etc., and those causing acneform eruption are usually the iodides and bromides.

Finally, scratch and intradermal tests in drug allergy would appear indicated in cases of urticarial and angioneurotic œdema due to the salicylates, barbiturates, morphine and its derivatives but here they invariably give negative results. Reason for this may be that the patient is reacting to the breakdown products of the drug rather than its original state; also many drugs such as morphine, codeine, pilocarpine, atropine and histamine are primarily urticariogenic, hence are not used in testing.

In conclusion, it is important to bear in mind that skin testing is only one diagnostic procedure, to be used when indicated and then evaluated in conjunction with the history, course and all the other clinical and laboratory data. However, when intelligently used and their limitations appreciated, skin tests in dermatology are a valuable aid in the solution and handling of many a baffling problem.

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RÉSUMÉ

Les manifestations cutanées fréquentes de l'allergie où les cutiréactions peuvent être utilisées sont l'allergie au contact l'atopie, l'allergie à l'infection et l'allergie aux médicaments. Les cuti-réactions peuvent aider à déterminer les allergènes responsables de certaines dermatoses, à choisir le médicament topique inoffensif, à établir le diagnostic différentiel, à trouver la cause de beaucoup de dermatoses industrielles, à sélectionner les employés de certaines industries. Les cuti-réactions ne constituent qu'un temps du diagnostic et il faudra accorder autant, sinon plus d'importance à l'histoire de la maladie, à son évolution et à sa présentation clinique. JEAN SAUCIER

"Now the great secret of wisdom undoubtedly consists in knowing what we ourselves are, what we can and what we ought to do; as that of prudence is to know what others are, what they can do, and to what they are inclined."—J. C. Lavater.

PÆDIATRIC ENDOCRINOLOGY*

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WE will endeavour to give an outline of the subject touching on the more common conditions to be met with in general practice, and treatment as we know it today.

Talbot[1] claims that the general practitioner can obtain enough knowledge during his ordinary practice to indicate first, whether a case is an endocrine disturbance or not, and second, if it is an endocrine dystrophy, to point out which glandular system is probably involved. Wagner[2] feels that endocrine and pseudo-endocrine problems in childhood, deserve consideration together. He states that if one were to count on the fingers of both hands the true endocrinopathies that are of importance in general pædiatric practice, there would be quite a few fingers left over.

The endocrine glands have for their purpose, the transformation of substance abstracted from the surrounding blood or lymph, into specific compounds, or internal secretions, known as hormones. The hormones act as catalysers on specific tissues or indirectly through the medium of the nervous system. The glands are singular organs secreting hormones at the most suitable time, in graded quantity with widespread effects, affecting every organ or part of an organ. There is close interdependence of the members of the endocrine system. This complicates diagnosis and treatment of endocrine conditions.

Hosen[4] describes three biologic phases entering into the physiologic evolution of an individual. (1) The primary tissue differentiation resulting in the development of the body organs. This is primarily dependent on the thyroid with the pituitary second in importance. (2) The somatic growth and function, dependent on the pituitary with the thyroid second in importance. (3) Reproduction. This is the responsibility of the gonads which cause uniting of the epiphyses preventing further growth of the body now arrived at maturity and preparing for reproduction.

Abnormal glandular action may be due to different factors. (1) Heredity, by which an endocrine weakness or susceptibility to glandular disorder is transmitted to the offspring. This congenital susceptibility may affect the same gland as that affecting the ancestor or parent, or a different gland entirely. A thyrotoxic parent may have a child who later develops acromegaly. Overfunction of a gland in the parent may give rise to underfunction in the offspring. Any variety of combinations may present itself. (2) Toxæmias of various kinds, due to acute, chronic or focal infections. (3) Abnormal action of other glands affect endocrine function. (4) Diseases of blood vessels, nervous system, tumour formation, food deficiencies, racial and constitutional factors.

Wagner[2] describes three groups: Group 1.—True endocrine disorders caused by a pathologic process or anomaly of an endocrine gland which may be even a congenital absence. Group 2.—Accentuations of physiologic phases of development, which sometimes imitate true endocrinopathies. Constitutional and familial factors are frequently involved. These, he feels, are pseudoendocrinopathies and are transitory states. Transitory infantilism, certain forms of obesity and disharmonic development are included. Group 3.—Congenital anomalies and multiple deviations and retardation of development, somatic as well as mental. Sometimes these are taken for endocrinopathies.

He advises the carrying out of routine measures for more accurate diagnosis. They consist of: (1) Exact body measurements and the growth rate when a patient is observed over a longer period of time. (2) X-ray examination for bone age, and eventually examination of the teeth and skull. (3) Appraisal of genital and extra-genital characteristics. (4) Examination of the eye grounds and visual fields. (5) Appropriate laboratory tests. (6) psychometric tests for intelligence. (7) Accurate records of response to treatment.

PITUITARY GLAND

This gland is the leader of the endocrine orchestra, "the master gland", the general headquarters of the endocrine system. It influences every other ductless gland and is important to growth and development. The secretions of its anterior lobe are more varied in function than the posterior, but the latter

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are more adequately standardized and commercially available for the physician.

Posterior lobe.—This lobe secretes an antidiuretic hormone which regulates the flow of water through the kidneys. Absence of it causes diabetes insipidus. The diagnosis usually presents no difficulty in differentiating it from polyuria due to nervousness or other causes. Rynearson and Keplar[5] recommend the study of the ability of the kidney to concentrate urine. The patient refrains from drinking fluids for 12 hours, then the specific gravity of the last specimen of urine passed through this interval is measured. The patient with diabetes insipidus cannot concentrate urine to a specific gravity of more than 1.010 regardless of abstaining from fluids.

Treatment.—Wohl and Larson[6] advise the use of the solution of posterior pituitary containing the antidiuretic principle "pitressin". The average dose is 0.5 to 1.0 c.c. hypodermically one to four times daily. It may also be used via the nasal route, in the form of a tampon of absorbent cotton or as dried posterior pituitary powder used as a snuff. Pitressin tannate in oil, 5 to 10 pressor units, intramuscularly is effective, the effect lasting from thirty to eighty-four hours.

Pitressin is as important to the case of diabetes insipidus, as insulin is to the case of diabetes mellitus.

Anterior pituitary lobe.—The hormones of this lobe have not been isolated in pure form for clinical use. Preparations are mixtures of several of the active principles, so-called "pituitary soup". The active principles are as follows:

1. *Growth principle.*—This influences skeletal growth by stimulating the epiphyseal cartilages. Commercial products are impure and experience with pituitary growth-promoting extracts have been disappointing.

2. *Thyrotropic principle.*—This has a definite relationship to the thyroid gland. Absence may give rise to a pituitary type of myxœdema. No improvement on thyroid administration is a diagnostic point.

3. *Diabetogenic principle.*—Malfunction may cause a definite type of diabetes.

4. *Gonadotropic principle.*—This consists of a follicle stimulating hormone (F.S.H.) and a luteinizing hormone (L.H.). The latter stimulates the interstitial cells of the testes and produces growth and development of the accessory sex glands in the male.

Anterior pituitary disorders are divided into: (1) hyperpituitarism, or overfunction; (2) hypopituitarism, or underfunction.

The chief pathological processes are: (1) neoplasm; (2) functional hypoplasia or hyperplasia; (3) destructive lesions, for example tuberculosis, syphilis, emboli and acute infectious diseases of childhood.

Hypopituitarism.—The diagnosis rests on three factors: (1) Elicitation of the etiological factors. (2) Observance of the various manifestations in the target organs, such as, skeletal undergrowth, genital underdevelopment, girdle type of adiposity with soft skin, sparse growth of hair and greater upper than lower measurements. (3) Laboratory findings such as normal or low basal metabolic rate, decreased specific dynamic action of protein, blood cholesterol within normal range, low blood sugar level and increased sugar tolerance, blood and urine low in pituitary gonadotropic hormones, low blood serum chlorides with an increase in concentration in urine. X-ray of the cranium may reveal pituitary disease, indicated by deformities of the sella turcica.

Intrasellar or suprasellar turcica tumour should be ruled out by x-ray before therapy for hypopituitarism is undertaken. All too often have patients come to an endocrine clinic for dwarfism or other manifestations after having received "injections" prior to admission, only to reveal a progressive tumour involving the optic nerve.

Pituitary infantilism or dwarfism is characterized by a general arrest of skeletal growth and an underdevelopment of all organs and systems of the body without adiposity. Such persons never develop sexual maturity nor secondary sex characteristics, but there is usually little, if any, mental retardation. The Lorraine-Levi type of dwarfism is characterized by diminution of all parts of the body, the infantile proportions being retained. Such patients are mentally alert, forward and aggressive.

Treatment.—This consists of surgical removal of an existing tumour, and of hormone therapy in other cases. Methyltestosterone, by mouth, is the best preparation available at present. It stimulates linear growth, but does not lead to early closure of the epiphyses. However, despite occasional case reports to the contrary, treatment with any of the growth hormones has been disappointing.

Frohlich's syndrome or dystrophia adiposogenitalia may become apparent in childhood, adolescence or maturity. Though frequently diagnosed this syndrome is comparatively rare. Classical cases are of small stature, shy, gentle, timid, easy-going and artistic, with fine skin, a deceptive youthful face, small hands and feet, a girdle type of obesity, small genitalia, occasionally cryptorchidism, and in females delayed menstruation to the fifteenth to the eighteenth year.

Treatment.—(1) An occasional case straightens out spontaneously. (2) Rule out cerebral tumour. (3) Correct obesity by a sub-caloric diet, high in protein, vitamin and calcium and associated with small doses of desiccated thyroid. (4) Injections of anterior pituitary extract containing both gonadotropic (antuitrin S) and growth hormones (antuitrin G). Pituitary extracts by mouth are not very effective.

Simmonds' disease—or pituitary cachexia due to extensive destruction or atrophy of the pituitary gland. Outstanding clinical symptoms—extreme emaciation, weakness, falling out of teeth and hair and development of premature senility, and a low basal metabolic rate down to –10 –40.

Treatment.—Concentrated foods. High vitamin diet especially the B group. Anterior lobe preparations.

THYROID

This gland controls the rate of growth and the orderly development and differentiation of tissues. All disorders of the thyroid seen in adults are met with in children. The thyroid secretion has as a constituent an iodine-containing hormone called "thyroxin".

Simple or colloid goitre.—The primary etiological factor is iodine deficiency. It is five to ten times more common in girls and occurs just before or at puberty. The principal symptom is visible enlargement. They usually subside without treatment. If they do not and are large, treatment consists of large doses of iodine and daily administration of 1 to 2 grains of desiccated thyroid and should be controlled by determination of the basal metabolic rate.

Hypothyroidism causes three groups of patients—endemic, cretins, sporadic cretins and acquired hypothyroidism. This condition is rarely diagnosed in the first half, but often in the second half of the first year. Diagnosis is difficult in the early months or in mild cases. One looks for evidence of delay in all phases of development and a sluggish metabolism. Patients look younger than their age. Roentgenograms of the bones for development should be a routine examination. A normal osseous development rules out cretinism.

Doubtful cases should be treated. Cessation of thyroid therapy in a true cretin causes a marked rise in the blood cholesterol. Such a response is not found in a child who is not hypothyroid. On the other hand, a small dose of desiccated thyroid (¼ to ½ grain daily), or better still, a single intramuscular dose of thyroxin (2 to 5 mgm.) causes a marked fall in the blood cholesterol of a hypothyroid. The normal individual shows a very slight or transient fall.

Acquired or juvenile hypothyroidism presents the same symptoms, the picture differing only in accord with the age the disease starts. Mental symptoms are less marked. Prognosis is food for normal growth and physical development, if proper treatment is started early and continued. Unfortunately it is not always so good for mental development, many remaining somewhat subnormal.

Treatment.—The same principles apply in the treatment of all types of hypothyroidism. In childhood the object of treatment is to cause the child to attain a level of physical and mental development as close to normal as possible. Desiccated thyroid U.S.P. given by mouth is the therapeutic agent of preference. It is immaterial whether the daily requirements of thyroid be given in single or divided doses. The requirements do not vary greatly with the age or size of the child. *It is best to give as much thyroid as the child can tolerate without having unpleasant toxic manifestations.* These consist of cramps, diarrhœa, vomiting, excessive irritability, fever, etc.

Dosage may be started at grains ½ daily and increased by increments of ½ grain not oftener than every 3 or 4 weeks. Growth, osseous development and mental development, must be regularly checked. Cretins have a tendency to develop rickets during the early stages of treatment.[8] This should be countered by adequate doses of vitamin D.

Hyperthyroidism. — Toxic or exophthalmic goitre. It is relatively uncommon in children. The body is flooded with an excess of hormone, "thyroid diarrhœa", as described by one writer. Symptoms do not differ greatly from those

occurring in adults; the four most frequent in children being nervousness, enlarged thyroid, exophthalmos and tachycardia.[9]

Treatment.—Iodine in the form of Lugol's solution is the medical treatment—5 to 10 drops daily. It is worthy of trial in the hope that the disease is self-limiting, or may be favourably influenced by the adjustments of adolescence. However, surgery is the treatment of choice.

Congenital goitre.—Usually subsides within 6 weeks without specific therapy.

OBESITY

Fat children are frequently met with in practice. In some cases as Ellis[10] states, the obesity will be a matter of great distress both to the child and her parents, while in others it is accepted as evidence of good digestion. According to Talbot,[11] most cases of obesity are not of endocrine origin but are due to eating more food than is required by the body. The condition is present where the child weighs more than 20 to 30% above the average weight for the height and age. The majority of such children are slightly taller than the average and their basal metabolic rate is higher. There is often a strong family tendency to obesity, due to hereditary factors, or to a family habit of heavy eating.

Treatment.—It is by diet, even in cases due to true endocrine disorders. Restrictions cannot be as great in growing children. The following diet has been found useful, especially when used with this combination of endocrine glands:

Fresh thyroid gland ..... gr. vi
Pituitary gland, whole body ..... gr. 1/16
Suprarenal gland desiccated ..... gr. 1/100

Breakfast: 1 egg, coddled or poached, 2 mornings a week. One or 2 slices of crisp bacon or 1 shredded wheat biscuit with 6 ounces of milk or 1 slice of calves' liver, 2 mornings a week, or ½ grapefruit or whole orange or 6 ounces of tomato juice, 3 mornings a week. Followed by: 1 teaspoonful of grape or apple jelly, ½ to 1 thin slice of toasted whole wheat, B vitamin or Gluten bread. Small cup of weak tea with 2 teaspoonfuls of milk or 4 ounces of skimmed milk.

Dinner: Cup of Bovril, consommé, clear beef or chicken soup or 6 ounces of tomato juice. Patte of scraped beef, fat free hamburg steak, cube steak, fat free lamb chop, 1 slice of calves' liver, small serving of rare fat free roast beef or fillet of sole. Two tablespoonfuls peas, string beans, spinach, cabbage, cauliflower, broccoli or stewed or cold canned tomatoes daily, served with salt and pepper only. Small serving of baked potato, young carrots, beets, baked squash or turnip 2 days a week. Any fruit jelly made with Knox's gelatine 4 days a week. Ripe peach, pear or apple or grapes 2 days a week. Sliced orange or grapefruit 1 day a week. Water to drink.

Supper: two days, when fruit is used for breakfast, poached or coddled eggs with salt and pepper. Other days any of the following salads: (1) Tomato and lettuce. (2) Chopped apple, peach and pear with lettuce. (3) Chopped apple and celery with lettuce. (4) Tomato jelly and lettuce. (5) Jellied vegetables and lettuce. (6) Peas, celery and raw carrot with lettuce. One-half to one slice of melba toast made from whole wheat or B vitamin bread. Glass of buttermilk, skimmed milk, weak tea, Welch's grape juice or orange juice. *Notes*: no fluid after this meal. Nothing but water between meals. Use saccharine for sweetening instead of sugar. Bacon should be crisp, pour the fat off as it forms in the pan while cooking. One teaspoonful of butter only daily. (To be used on toast.) One Abdec kapseal at bedtime.

The best results will be obtained by aiming at a gradual loss of weight over a long period, or by keeping the weight stationary whilst the child "grows up to it", and so approaches normal.

UNDESCENDED TESTICLE

Cryptorchidism is due to: (1) Mechanical factors. (2) Inadequate gonadotropic hormones. It may be bilateral or unilateral. The incidence is 30% in prematures, 10% in newborns, and 2% in older children.

Spontaneous descent may occur any time up to puberty. Mal-descent leads to hernia, hydrocele and tension of the spermatic cord. It causes complete suppression of the spermatozoa formation, and partial arrest of hormone elaboration. Both functions become normal if the testes arrive in the scrotal sac before puberty.

Treatment.—Endocrine therapy first is the treatment of choice. Antuitrin S 100 to 300 rat units three times weekly. Pituitary gonadotropin and testosterone may also be used with intermingled rest periods of one month. Treatment should be carried out from three to six months at least. Being simple and devoid of danger, it is advisable to give this treatment early, from 2 to 5 years of age, as there is no way of knowing when and if the testes will descend. As Harding[12] asks, "Why wait for nature to improve some of these deficiencies at puberty, that can be corrected when they are discovered?"

Unsuccessful endocrine therapy should be followed by surgical treatment. The latter alone has been disappointing. Previous endocrine therapy softens the tissues, lengthens the cord, enlarges the testes and develops the scrotum and enhances later surgery.

MONGOLIAN IDIOCY

This condition is thought by some to be due to an intra-uterine glandular disorder, perhaps pituitary. Dunn[13] reports moderate success

with a limited number of cases. He advocates instituting treatment early, and informing the family that one must be satisfied with gradual but progressive improvement. Treatment consists of thyroid extract ¼ to ½ grain and anterior pituitary substance, 1 to 2 grains daily. Calcium is also given 10 to 20 grains a day.

SUMMARY

From the foregoing it is seen that endocrinology has its place in the field of preventive medicine. A deficiency in the fetus is easily caused by a dysfunctioning gland of the mother, equally true is the fact that a deficiency in the fetus may be caused by improper diet of the mother—examples are hypothyroidism of newborn infants recognized at birth and treated with excellent results. This brings up the point that endocrinology is a necessary field in pædiatrics, otherwise such cases have been known to have been overlooked and untreated until too late for the case to respond adequately. The result is that the specialist in endocrinology is called upon to treat cases that do not respond as desired. This is discouraging both to the doctor, patient and parents, and retards endocrinology as a field of medicine. Early diagnosis may prevent permanent dysfunction, if properly treated.

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The wise never speak in the superlative, for that mode of speech always offends either Truth or Prudence. Exaggerations are so many prostitutions of reputation, inasmuch as they expose the shallowness of the understanding and the bad taste of the speaker. Exaggeration is a species of lying; he who exaggerates shews himself to be a man of bad taste, and, what is worse, a man of mean intellect.—*Proverbs of Gracian.*

CASE REPORTS

GANGLIONEUROMA OF STOMACH*

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In reviewing ganglioneuromata reported up to 1930, McFarland[1] did not report any of the stomach and only one elsewhere in the alimentary tract.[2] In 1936 Raska and Skorpil[3] reported one of the stomach and Bertini[4] reported a ganglioneuromatous polyp of that organ. In 1937 Lichtenstein and Ragins[5] reported a ganglioneuroma of the vermiform appendix and in 1942 Foster[6] found a ganglioneuroma of the pharynx.

The case to be reported now is a ganglioneuroma of the stomach and as such is the third reported in all the literature and the second in the English literature.

A 68-year old spinster was first seen in August, 1939, complaining of gaseous abdominal distension and eructations of three years' duration coming on after food, particularly fatty foods. A year and a half previously she had an attack of nausea and vomiting which lasted for two days and since that time had had occasional attacks of pain in the right upper quadrant radiating about the right costal margin to the back. Six months prior to being seen she had another attack of nausea and vomiting which was relieved by a low fat diet, and during the month prior to examination she complained of a persistent dull right upper quadrant pain. The remainder of her history was non-informative. She was a retired registered nurse who had lived in Honolulu for a number of years. Her past illnesses, all many years prior to this episode, were tonsillitis with tonsillectomy, appendicitis with appendectomy, and pneumonia. She had recovered from all of these uneventfully.

On physical examination she appeared poorly nourished. There was a small adenoma in the left lobe of the thyroid. The remainder of the examination was negative except for the abdomen. This was described as scaphoid with a dimpled grid-iron incision in the right lower quadrant. It was soft and there was no rigidity. In the epigastrium just to the right of the midline was a firm mass the size of an orange which was non-movable, non-pulsating and slightly tender. The aorta was easily palpable below the umbilicus, and neither kidney, spleen or liver could be felt.

A cholecystogram was done and appeared normal. A gastro-intestinal barium series was done and the following report is taken from the radiologist's examination sheet and in the light of the subsequent microscopic examination, the radiologist's diagnosis was a most creditable one.

X-ray findings.—"The position of the stomach was normal with the lesser curvature three inches above the intercristal line. The stomach is of a 'J' type and of medium size. The incisura is not remarkable but in the pyloric antrum, three inches from the pylorus on the posterior wall, is a smooth filling defect the size of a Japanese orange with ulceration of the overlying mucosa and fixity of the stomach at the lesion. The motility of the stomach is orthotonic with complete

* From the Laboratories of the Vancouver General Hospital, Vancouver, B.C.

evacuation in two hours. There is a diverticulum at the first portion of the jejunum. The remainder of the gastro-intestinal tract is not remarkable. Probable diagnosis: Leiomyoma or leiomyosarcoma.''

Operation.—On September 5, 1939, following usual preparation, a gastrotomy and excision of the tumour was done and the surgeon's report is as follows:

''A six-inch left paramedian incision was made one-half inch from the midline between the ensiform cartilage and the umbilical region. On opening the abdomen, the stomach presented itself. It appeared normal in size. The duodenum was free and normal. Palpation showed a tumour the size of a small orange on the posterior surface and lower portion towards the pyloric end. The omentum was adherent to the right side of the abdomen near the umbilicus.

''An incision three and one-half inches long was made longitudinally in the stomach over this tumour area. The tumour showed an ulcer one inch long over the anterior surface. No glands were found either above the stomach or below it. The mass seemed smooth and the appearance was of non-malignancy. A circular incision was made near the base and the mass enucleated. It seemed to lie just anterior to the main muscles of the posterior wall of the stomach but it was impossible to excise it without practically cutting through the muscle. This was all done with care.

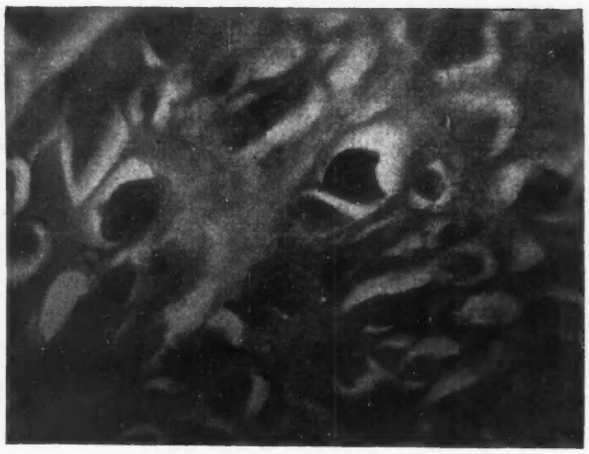
''The muscle was closed and the whole wound, including the mucous membrane, was then sutured, both with chromic catgut. This wound was closed so as to widen the stomach in this region by closing it perpendicular to the axis of the stomach. The anterior wall of the stomach was then closed with running suture of chromic catgut. A reinforcing suture of chromic catgut was also used through the muscle and serous covering of the stomach. The left omentum was then sutured over this area. Usual closure was made.''

The recovery of the patient was uneventful and she was discharged on a modified Sippy regimen on the thirteenth postoperative day. Two and one-half months following operation she was taking a full diet and feeling well. Now, seven years after operation, she is alive and well with no gastric complaints.

PATHOLOGICAL FINDINGS

The tumour, when received by the Pathological Department, was seen to be a well circumscribed mass measuring 5 x 4.5 x 3.5 cm. It was partially surmounted by gastric mucosa, the area of mucosa resected measuring 4 x 4 cm. This was lightly fixed to its surface. In the mid-portion of the mucosa an area of ulceration is present 2.8 x 2.5 cm., over which the entire mucosa is lost, the tumour mass forming the base. Superficially the mass had a very slightly nodular appearance and on section presented a lobulated cut surface with light fibrous strands interspersed amongst the lobules, which were composed of yellowish, semi-translucent tissue resembling adipose tissue. From the appearance, the general impression was that it could be a lipoma or fibrolipoma and was apparently benign.

A very excellent presentation of the histology of ganglioneuroma is given in the article by Bigler and Hoyne[7] and there appears to be no virtue in re-iterating it in this paper.



Microphotograph of section of tumour showing large ganglion cells. Hæmatoxylin and eosin staining (x 650).

Sections of the tumour in our case were stained by hæmatoxylin and eosin, toluidine blue and Cajal's pyridine silver methods and they show a well circumscribed neoplastic process consisting of numerous variably sized and shaped ganglion cells supported by a fairly myxomatous appearing and more compact fibrillar neurogenic stroma. This is seen to consist, in the Cajal pyridine silver stained section, of rather fine fibrillar structures, many showing the so-called varicosities described by Bigler and Hoyne, as in their material, no definite myelin sheaths could be identified. The ganglion cells for the most part have single nuclei but there are a fair number of bi-nucleated ones and a few with four or five. Areas of a more neurinomatous, loosely arranged structure are noted and this would appear to be due, in part, to some œdematous imbibition. In the toluidine blue preparations, quite definite ''tigroid'' bodies were noted in the ganglion cells, the numbers and density varying to a considerable degree.

SUMMARY

A case of a well circumscribed tumour in the gastric wall is presented which, from a histological examination, would appear to fulfil all criteria of a ganglioneuroma.

Our thanks are due to Dr. J. W. Thomson, of Vancouver, for permission to present this paper.

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TRUE UNICORNUATE UTERUS AND TOTAL ABSENCE OF LEFT BROAD LIGAMENT, ROUND LIGAMENT, SALPINX, OVARY, KIDNEY AND URETER

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In 1941, Varino and Beacham[1] reported a case of true unicornuate uterus with complete unilateral absence of broad and round ligaments, tube, ovary, ureter and kidney. These authors state that until 1941 the only other report of a similar case was published by Dannreuther[2] in 1923. The case we are now presenting is identical with these two cases, even to the side of the anomaly.

Mrs. R.M., white, aged 23, para (ii), was admitted to the Brantford General Hospital on January 13, 1946, complaining of pain in the right lower quadrant of the abdomen, associated with nausea and vomiting.

Her menstrual periods had been perfectly regular, occurring every twenty-eight days, lasting about ten days, with rather profuse flow. Her last menstruation period was December 20, 1945 and was perfectly normal in all respects. At the age of fifteen she had an illegal operation when she was two months' pregnant. In 1943, she had a full term living child, pregnancy and confinement being uncomplicated.

The patient was well nourished and presented the physical and laboratory findings of acute appendicitis. The white cell count was 16,300, and the temperature was 99.6. Abdominal examination revealed the presence of localized tenderness in the right lower quadrant, maximum over McBurney's point.

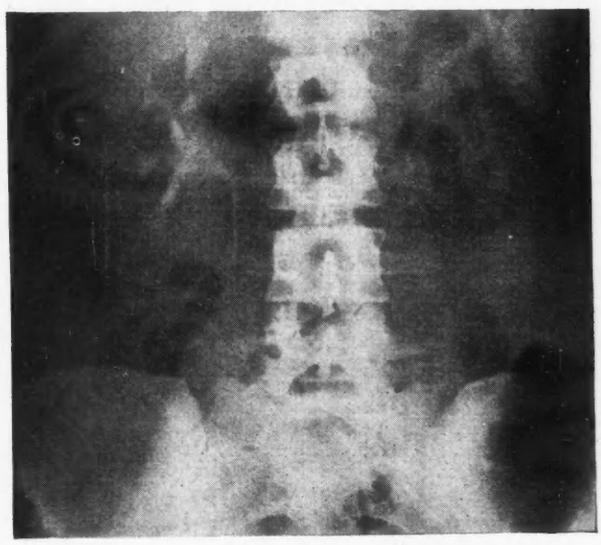

Fig. 1

The clinical diagnosis of acute appendicitis being established, the patient was operated upon on January 13. Under ether anæsthetic the abdomen was opened through a McBurney split muscle incision. On opening the peritoneum free blood was found and on inspection we found a hæmorrhage coming from a ruptured Graafian follicle in the right ovary. The right tube appeared to be normal. The uterus was normal in size, shape and position and on further inspection and palpation of the pelvic structures, it was found that there was complete absence of the left Fallopian tube, left ovary, left round and broad ligaments. The appendix was not acutely inflamed and was removed in a routine manner. The abdomen was closed in layers and the patient made an uneventful recovery.

An intravenous pyelogram was made on January 21, to prove the absence of the left kidney and ureter. As shown in Fig. 1, the pelvis and calyces of the right kidney are well filled ten minutes after the intravenous injection of diodrast. The left kidney and ureter are not visualized.

SUMMARY

A case of true unicornuate uterus and total absence of the left broad ligament, round ligament, salpinx, ovary, kidney and ureter is presented.

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CONGENITAL ATRESIA OF THE ŒSOPHAGUS*

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Congenital atresia of the œsophagus is a much more common anomaly than is generally recognized. There are now more than 400 cases on record. In 1929, Vogt[1] formulated a classification of the various types of œsophageal anomalies which has been generally accepted in the discussion of this developmental defect (Fig. 1).

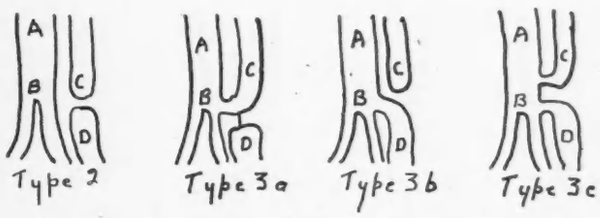

Fig. 1.—(A) trachea; (B) bifurcation of the trachea; (C) upper segment of the œsophagus; (D) lower segment of the œsophagus.

Type 1, or complete absence of the œsophagus; Type 2, a blind upper and lower end

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to the œsophagus; Type 3a, a blind lower segment and an upper segment communicating with the trachea; Type 3b, a blind upper segment and a lower segment communicating with the trachea; Type 3c, an upper and lower segment both communicating with the trachea. Type 3b is the commonest type found, the others are rare.

There has been no clear embryological explanation of these œsophageal anomalies. Separation of the trachea from the foregut occurs in early fetal life. The first indication of this separation is the appearance of the so-called laryngo-tracheal groove, a diverticulum running lengthwise in the floor of the gut, just caudal to the pharyngeal pouches. This diverticulum is destined to become the larynx and the trachea, and its caudal end, by a process of budding, produces the bronchi and the remainder of the respiratory tree. As the embryo grows, two longitudinal grooves, which appear internally as ridges or septa, develop on either side in the angle between the respiratory diverticulum and the œsophagus. These grooves deepen and the septa approach each other and fuse, thus separating the caudal portions of the diverticulum from the œsophagus. Rosenthal[2] believes that deficient or absent growth of the lateral septa results in fistulæ between the trachea and œsophagus, while deficient growth of the entodermal cells of the fore-gut results in atresia of the œsophagus. Another theory is that atresia may be due to the lateral septa deviating posteriorly, and fusing with the dorsal wall of the foregut, because of variations of pressure within the embryo.

The symptoms of œsophageal atresia are constant and diagnostic, and the condition should be suspected in any newborn who vomits immediately after feedings. He may, in addition, be subject to attacks of choking and cyanosis following the feedings, either due to the passage of the fluid into the trachea via a fistula between the upper end of the œsophagus and the trachea, or by regurgitation and aspiration where there is no such communication, as in Vogt's types 2 or 3b.

If a soft rubber catheter is inserted into the œsophagus, an obstruction will be revealed, usually 10 to 12 cm. from the gums of the infant. Contrast substances, such as barium and lipiodol have been used, but their use is accompanied by the danger of aspiration and an irritative pneumonitis.

In 1929 Vogt,[1] stated that, "Congenital œsophageal atresia has up to the present, been one hundred per cent fatal". In 1943, Haight and Townsley[3] reported a successful case of extrapleural ligation of a tracheo-œsophageal fistula and end-to-end anastomosis of the œsophageal segments, and a further 13 successful cases have now been recorded in the literature. Nineteen patients have survived the indirect method of surgical attack which consists of ligation of the fistula, gastrostomy, and cervical œsophagostomy, with the eventual formation of an ante-thoracic œsophagus although this has not been completed in all.[4] These reports are encouraging when it is considered that the condition of congenital atresia of the œsophagus was considered to be invariably fatal in 1929.

The following case report from the public service of the Grace Maternity Hospital, Halifax, is that of a congenital atresia of the lower œsophagus, Vogt Type 2, with a blind end to both upper and lower segments of the œsophagus and no tracheal communication, one of the rarest of all types of this developmental defect.

The mother, a twenty-three year old primipara, white, was admitted to hospital on October 6, 1946, and had been followed throughout her pregnancy at the Dalhousie Public Pre-Natal Clinic. Her pre-natal course was normal and the outlook for labour predicted as favourable.

On October 6, she was delivered of a living male child, weighing five pounds, eight ounces, by episiotomy and low forceps, following a labour of forty-eight hours and thirty minutes. The indication for forceps was fetal distress as evidenced by the slowing of the fetal heart from 148 beats a half hour before delivery, to 110 just before delivery.

The infant showed marked evidence of asphyxia at birth and resuscitation measures had to be employed. Large amounts of mucus and amniotic fluid were aspirated from the pharynx, and the baby was breathing well on leaving the case room. General examination revealed a rather puny child with a low receding forehead, but there were no obvious abnormalities visible on examination.

On the second day of life it was noted that the baby was not taking his feedings properly. He appeared to be hungry and would swallow two or three drams of the feeding, only to regurgitate it a few seconds later. Efforts were made to gavage the infant, the tube passing down the œsophagus about 12 to 15 centimetres, only to come up against an impassable obstruction, and a congenital atresia of the œsophagus was suspected.

Subcutaneous injections of 2.5% glucose in normal saline were given twice daily, but the weight steadily declined. On October 12, the temperature rose to 105° F., and râles were heard at the right lung base. Penicillin and oxygen were administered with no response, and the infant expired at 2.30 p.m., October 13, six days after birth.

Post-mortem examination (performed in conjunction with Dr. Ralph P. Smith).—Examination of the œsophagus revealed a complete atresia at the level of the tracheal bifurcation, forming a cigar-like dilatation of

the upper end of the œsophagus. Extending upwards from the œsophageal orifice of the stomach, was a small pouch, 1½ cm. in length. There was no connecting tissue found between this pouch and the upper end of the œsophagus, nor could any connection of either sac with the trachea be demonstrated, the trachea being normal throughout its length.

The lungs showed large atelectatic areas in both upper lobes. In addition, gross examination showed consolidation of a patchy character in the right lower lobe, right upper lobe, and to a lesser extent, in the left lower lobe, the appearance being that of a confluent septic broncho-pneumonia, probably of an aspiration type.

The kidneys showed the usual fetal lobulation, and were joined together at their inferior poles, producing a true horse-shoe kidney, with two distinct renal pelvi, and two ureters.

The heart, spleen, liver, ureters and bladder, and intestine were essentially normal. The brain was not examined. No other congenital anomalies other than those described were found.

SUMMARY

Vogt's classification of congenital atresia of the œsophagus is reviewed, with a short summary of the embryology, symptoms, and advances in the surgical treatment, followed by the case history and post-mortem findings of a Vogt's Type 2 of this congenital anomaly.

My thanks are due to Dr. Ralph P. Smith, head of the Department of Pathology, Dalhousie University, Halifax, Nova Scotia, for his kind and constructive criticism, in the preparation of this paper.

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PULMONARY TYPE OF TULARÆMIA

(Two Cases)

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Tularæmia is an acute infectious disease caused by *B. tularense* and occurs under natural conditions in over twenty kinds of wildlife, especially in wild rabbits and hares.[1] There is no record of infection from man to man. The stable and deer fly are also mentioned as transmitters of tularæmia;[2, 3] both are present in the Norman Wells District of the MacKenzie River Territory.

The most frequent source of infection mentioned is wild rabbit. In presenting 40 cases in Alberta, in 1944, Bow and Brown list the following contacts, rabbits, ground squirrels, cats' ticks, grouse, mink, sheep, swine, and skunk.[4] Mention is also made of one epidemic in Russia, in 1928, from a brook that was thought to be contaminated.[1]

From the above, one would expect this disease to be more prevalent in the remote areas where rabbits are used extensively as food, and I am of the opinion that it will be found both as a human ailment and among animal, bird, and insect life of our Canadian bush, muskeg and Barren Lands, if only it is looked for. This would require laboratory equipment and personnel in remote areas.

Two cases of the pulmonary type of tularæmia are presented. I have used this title because these cases did not fall under any of the types usually mentioned, namely ulco-glandular, typhoid or ocular.

CASE 1

April 20, 1946.—A thirty-eight year old Indian woman and her four-year old Metis son were reported ill with cough and pain in the chest, on April 20, 1946, 15 miles up the MacKenzie River.

The mother was admitted to the Norman Wells Camp Hospital with the symptoms of a severe lung infection on April 29.

On admission she had a troublesome cough, pain in the chest, weakness, cyanosis and fever, 103°, pulse 160. The breath sounds were distant on the right side.

April 30.—The urine showed sugar and albumen but no casts. The patient was given oxygen for marked air hunger. Expectoration was blood stained. As she was restless and thrashing about, morphine, gr. 1/6 was given hypodermically. Medication consisted of penicillin, sulfapyridine, and plenty of fluids. Sulfapyridine was discontinued when albumen was noted in the urine.

May 1.—Vitamin tablets were started. The breath sounds were becoming stronger. The right pleural cavity was aspirated and only a few c.c. of pus obtained.

May 2.—Penicillin discontinued. Temperature was almost down to normal.

May 4.—Nothing obtained on aspiration of the chest.

May 7.—Vesicular rash developed on right hand and arm and left side of back. This became pustular, and later pitting ulcers developed.

May 14.—The general condition continued to improve slowly. She sat up in bed but seemed to need a good deal of encouragement to move about even in bed. She complained of weakness of legs on getting up.

May 27.—The pulse and temperature were up again and she complained of pain in the chest. Cough and expectoration present.

May 31.—Temperature and pulse came to normal and from now on she felt much better, and steadily improved till her discharge on June 15. Convalescence was slow.

X-ray and special reports.—X-rays on admission showed bilateral density in the lungs, which was considered to be a pneumonic process, with possibly left-sided pleurisy. A film taken in October at first showed some residual mottling, but a repeat x-ray later showed no definite evidence of pulmonary disease.

The pleural fluid showed no acid-fast bacilli. Inoculation of a guinea pig with the fluid later produced negative results; sputum was negative for tubercle bacilli.

Serum reaction was positive for *B. tularense*. Reactions were negative for the typhoid and paratyphoid group and for *B. abortus*. Wassermann was negative.

CASE 2

This 4-year old patient, son of the woman whose case is reported above, was admitted on May 1, 1946, temperature 101°, pulse 160, and respirations 40. He complained

of cough, pain in the chest, rapid shallow respiration and weakness and seemed very ill. Penicillin was started.

May 3.—Temperature 99, pulse 132, and respirations 40. Penicillin discontinued. The breath sounds are distant on the right side.

May 10.—Breath sounds are coming through better. The cough is troublesome and he had choking spells.

May 15.—Temperature elevated to 101, pulse 130. Penicillin was repeated for two days but this did not seem to be of any benefit.

May 26.—Pustules appeared on face and lower limbs. These gradually subsided, leaving small ulcers. The evening fever continued.

June 14.—Aspiration of pleural cavity was done, and about a dram of thick pus obtained.

June 15.—Temperature down to normal and pulse down to 110. Although he had lost a good deal of weight he was much brighter. On this date he was discharged for convalescence.

The x-ray showed increased density in the right chest, but not of a uniform nature. This was thought to be due to pockets of empyema, or possibly a pneumonic condition.

The pus obtained on aspiration showed pus cells and mixed bacteria both Gram-negative. Guinea pig inoculation was negative for *B. tularense*.

SUMMARY AND CONCLUSIONS

I may say that I was guided in my diagnosis by Dr. E. A. MacKenzie's article on Tularæmia in a recent number of this *Journal*.[5] The following points are noted.

1. Infested squirrels (McKenzie Red Squirrel) has been skinned in the one-roomed log cabin.

2. The only blood tested reacted 1/400 to *B. tularensis*.

3. The severity of the illness and the slow recovery as compared with the chest findings.

4. The failure to respond to sulfapyridine and penicillin.

5. The skin lesions that seem to be an accompaniment of this disease.

6. The following evidence of a small abscess is presented: (*a*) On three pleural aspirations only a few c.c. of pus were obtained. (*b*) The x-ray in case 2 suggested pockets of pus. This conforms with the description to me by Mr. Pepper's (trader and trapper) of his autopsies on snowshoe rabbits at Aklavik, namely, that there were many abscesses in the chest.

7. There were three other children living in the small log cabin who did not develop this illness.

8. In these two cases there was no apparent "portal of entry" lesion. The lymph glands were not noticeably enlarged.

These two cases established that tularæmia does occur in the Northwest Territories. More investigation should be done, and to get the best results a travelling laboratory should proceed to the remote areas. Better results would be obtained if this investigation was undertaken in those areas where the rabbits are dying off.

Appreciation is expressed to the Imperial Oil Ltd., for their kindness in supplying equipment; to John H. Brown, M.Sc., Entomologist, University of Alberta, for supply of literature and advice; to R. R. Parker, Director, Division of Infectious Diseases, Rocky Mountain Laboratory, Hamilton, Mont., for literature and advice; to Mrs. Mildred Kormack for the preparation of charts; to Dr. A. H. Baker, Central Alberta Sanatorium, for reading the x-ray plates; and to Dr. R. M. Shaw, Provincial Laboratory, University of Alberta, for his advice and for doing the laboratory work.

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LYMPHATIC LEUKÆMIA BECOMING ALEUKÆMIC

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It appears from the literature that cases of leukæmia often start with an aleukæmic phase, whilst the reverse seems rather rare. Consequently, I think the following case is worth while recording.

The patient, a man of 40, was admitted to hospital in June, 1927 and diagnosed as mental deficiency with psychosis, schizophrenic type. He had been physically well until about six weeks prior to his death, when he complained of a sore throat and general malaise. The following day his temperature rose to 101.4°, then to 101.8°. Physical examination revealed an acute streptococcal pharyngitis and he was put on sulfa drugs. His temperature returned to normal and apart from painful external hæmorrhoids he appeared well.

On June 12, he complained again of a sore throat as well as "aches and pains in all his bones". He was put on sodium salicylate gr. xv b.i.d. and seemed to improve gradually, so that ten days later he could be allowed up. Following this he appeared to suffer a relapse and on June 24, his temperature rose again to 101°, his pulse rate to 104, but his respiratory rate remained at 20. He complained of pain in his left chest and there was swelling and inflammation of the right eye. As the latter cleared up completely, I doubt whether it was due to leukæmia. Inflammation of the eyes in

leukæmia is not rare, but the diagnosis has usually been firmly established by the time this appears. Wintrobe and Mitchell[3] reported two cases, however, in which inflammation of the eye was the first indication of the patient having leukæmia.

A tentative diagnosis of pneumonia was made because of the pain in the chest and the patient put on sulfathiazole. In spite of this therapy his temperature rose to 104.4° on June 26, and a chest x-ray revealed no evidence of pneumonia. The following day he was started on penicillin 25,000 units q.3h. His temperature subsided to 101° by the afternoon but he complained of a headache. As a result of a complete blood count taken on that day (see special chart) a diagnosis of lymphatic leukæmia was made. The red blood cell count and hæmoglobin percentage were already considerably below normal, so it seems reasonable to assume that the leukæmia had been present for some time. His white blood cell count, then 66,400 c.mm. seemed to almost halve itself daily until death and therefore can be assumed to have been considerably higher than 66,400 at the beginning of the fatal illness.

This rapid decrease of the white blood cells is the most remarkable feature of this case and I have been unable to find a similar case in the literature. Martin Hynes[2] describes cases which were leucopenic throughout the period of investigation; if blood counts had been done sooner a leucocytosis might have been found, but none of his cases showed the gradual and continuous decrease in the white blood cell count, which was so characteristic of this case. The type of white cell affected was the lymphocyte which fits in with Nicholson's statement that most cases of aleukæmic leukæmia are of the lymphocytic variety.

The same day as the diagnostic blood count was taken the patient had to be catheterized for acute retention of urine. This brought up the question of prostatic hypertrophy caused by leukæmic deposits as in the three cases reported by Wintrope and Hasenbush, 1939. Later findings, however did not justify any such assumption. Blood, fæces and throat cultures revealed no abnormalities.

Liver therapy was started, 3 c.c. being given daily until July 2 when it was stopped because abscesses had developed at all the injection sites, and it became apparent that this treatment did not benefit the patient. A severe anæmia of an aplastic type with only very few immature red blood cells developed rapidly. This confirms Boyd's statement that there is no erythroblastic activity in lymphatic leukæmia. F. R. Miller and D. L. Turner[1] observed that nucleated red blood cells and reticulocytes are more common in acute myeloid than lymphatic leukæmia.

Except for the terminal four days this anæmia was macrocytic, but then it became microcytic although some well hæmoglobinized macrocytes could still be found in the films. Martin Hynes[2] observed that in aleukæmic leukæmias in adults the anæmia was usually macrocytic, whilst in children it was usually microcytic.

As can be seen from the accompanying chart, the patient's red and white blood cell counts as well as his hæmoglobin percentage gradually dropped until death July 9, whilst his temperature and blood sedimentation rates rose and clinically he became weaker and paler.

At no time during the course of the illness was there evidence of enlargement of his liver, spleen or lymph glands, although at autopsy leukæmic infiltrations into these organs were found. Mertin Hynes[2] made the same observation in his aleukæmic leukæmias.

Petechiæ appeared late and were not very noticeable. Miller and Turner[1] claim them to be more marked in acute myeloid leukæmia.

Autopsy.—An autopsy was performed on July 10 and the following were the main findings: There were petechial hæmorrhages on the thighs and extensor surfaces of the legs and on the pericardium, and numerous hæmorrhagic spots in the omentum and visceral peritoneum.

The liver, which weighed 1,240 gm., was slightly pale. The spleen was enlarged and its capsule thickened in places. Its cut surface had a deep red appearance and the pulp was rather soft. A spleniculus, about 1 inch in diameter, was found at the hilum of the spleen. The pancreas, like most of the organs, was pale, but otherwise normal. About 50 c.c. of clear fluid were found in each pleural cavity and about 20 c.c. in the pericardial sac.

The kidneys were pale and showed fair differentiation between cortex and medulla. In the right a small pale, wedge shaped area about 1 cm. x 1 cm. was seen and it was suspected of being a leukæmic deposit. At the lower pole of the left a small superficial hæmorrhage was found.

All the lymphoid tissue was prominent, but none of the glands showed any great increase in size. The median part of the left first rib contained red, the sternum greyish and the shaft of the right femur greyish-red marrow.

Microscopic appearances.—Leukæmic deposits were found in the left lung, the liver and kidneys. The normal structure of the spleen, spleniculus and all the lymph glands examined was lost due to marked lymphocytic cell infiltration. Marrow slides were characteristic of lymphatic leukæmia.

TABLE I.

Date	R.B.C. in mill.	Hb.	W.B.C. in thous.	Differential—300 cells counted: Lymphoblast	Prolymphocyte	Reider's prolymph.	Lymphocytes	Polym.	Eosin.	Remarks
26/6/46	2.210	5.5 gm. 35.5%	66.4	% 9.67 6,421 c.mm.	% 82.33 54,667 c.mm.	% 4.67 3,101 c.mm.	% 2.0 1,328 c.mm.	% 1.33 883 c.mm.	..	There are 0.33% erythroblasts and very few polychromatic cells. Many disintegrated prolymphs and basket cells. A few macrocytes are seen.

Date	R.B.C. in mill.	Hb.	W.B.C. in thous.	Lymphocytic cells	Monocytes	Basophiles	Polym.	Eosin.	Remarks
28/6/46			32.85	96.5%	..	0.25%	3% 986 c.mm.	0.25%	Nearly all lymphocytes are immature.
29/6/46			18.86	97.0%	..	..	3.0% 566 c.mm.	..	Nearly all lymphocytes are immature.
30/6/46	1.78	5.1 gm. 33.0%	11.9	99.0%	..	..	1.0% 119 c.mm.	..	Nearly all lymphocytes are immature. Slight hypochromia and poikilocytosis; moderate anisocytosis. Some well hæmoglobinized macrocytes present.
2/7/46	1.84	5.1 gm. 33.0%	3.57	99.0%	..	..	1.0% 36 c.mm.	..	Nearly all lymphocytes are immature.
3/7/46	1.52	4.5 gm. 29.0%	3.45	94.0%	..	..	6.0% 207 c.mm.	..	Many immature lymphocytes and basket cells. Very slight poikilocytosis, moderate anisocytosis.
4/7/46			2.8	92.0%	..	..	7.0% 196 c.mm.	1.0%	Most lymphocytes are immature.
5/7/46	1.22	Less than 21.0%	2.5	90.0%	..	..	10.0% 250 c.mm.	..	There is a microcytosis.

Date	R.B.C. in mill.	Hb.	W.B.C. in thous.	Differential—200 counted: Lymphoblast	Prolymphocyte	Reider's prolymph.	Lymphocytes	Myeloc.	Polym.	Eosin.	Remarks
6/7/46			1.9	9.0% 171 c.mm.	60.0% 1,140 c.mm.	1.5% 28.5 c.mm.	14.0% 266 c.mm.	0.5% 9.5 c.mm.	13.5% 256.5 per c.mm.	1.5%	There are 0.5% erythroblasts and a small number of polychromatic cells. A few basket cells and disintegrated prolymphocytes are seen. There is a moderate degree of anisocytosis and poikilocytosis and some macrocytes are present.

Date	R.B.C. in mill.	Hb.	W.B.C. in thous.	Lymphocytic cells	Monocytes	Basophiles		Myeloc.	Polym.	Remarks
8/7/46	0.792	2.4 gm. 15.0%	0.95	74.0%	..	..	..	24.0% 228 c.mm.	2.0%	No regenerative red cells seen. Most R.B.C.'s are microcytic, but a few well hæmoglobinized macrocytes can be seen. Most of the lymphocytes are of the mature large variety.

It is rather interesting to note that the pancreas was normal both macroscopically and microscopically. In a review by Gwendolyn Crass[4] of 70 cases of leukæmia she stated that in all these cases of the acute and chronic type the pancreas was invariably found to be normal.

DIFFERENTIAL DIAGNOSIS

Pernicious anæmia.—The macrocytosis was in favour of it, but the total white blood cell count and the presence of so many immature white cells immediately ruled out this diagnosis.

Aplastic anæmia.—The severe anæmia with the absence of evidence of regeneration of red blood corpuscles suggested that diagnosis but again the white blood cells were against it.

Infectious mononucleosis.—The unexplained pyrexia, sore throat and presence of abnormal mononuclears in the blood made it necessary to briefly consider this in the differential diagnosis, but a negative Paul Bunnell reaction on June 28 and the further course of events ruled this out as a possible diagnosis.

Leukemoid reaction in carcinomatosis and sarcomatosis of the marrow.—The autopsy and microscopic examinations of the bone marrow lent no support to this diagnosis.

My thanks are due to Dr. J. Morton who was in charge of this case for his kind help and advice and, to Mr. Morley, an attendant at this hospital, for providing the photographs.

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THIAMINE CHLORIDE IN PERNICIOUS ANÆMIA

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The etiology of the general symptoms of pernicious anæmia is well accepted to be the lack of an intrinsic factor which is produced in the stomach, and accumulated in the liver and other internal organs. This etiological factor, however, can not fully explain the changes in the spinal cord and the peripheral nervous system.

Mellanby[1] thinks that there are two deficiency factors at work in pernicious anæmia: one, acting upon the bone marrow, and one on the spinal cord, and he considers the factor which affects the spinal cord to be a lack of vitamin B^1. Other writers on this subject believe that while the general symptoms are caused by deficiency, the spinal cord changes appear to be rather of a toxic origin.

In confirmation of this duality of the cause of general and neurological signs, we might mention the fact that many authors are of the opinion that liver therapy, which is so effective in the alleviation of the general symptoms in pernicious anæmia, is not so effective in the treatment of the neurological complications of this disease.

J. C. Meakins[2] states that treatment of neurological lesions with liver preparations is much less satisfactory than in the general symptoms of pernicious anæmia. I. S. Wechsler[3] is also not very optimistic about the effectivity of liver preparations. He says that although they prevent the occurrence of spinal symptoms and arrest further development of these symptoms, they are not as effective in the treatment of existing symptoms. He suggests a diet rich in vitamin B_1.

R. Grinker[4] writes that while liver therapy might prevent occurrence of spinal symptoms, and might arrest further development of such spinal symptoms, too much reliance should not be placed on the improvement of existing spinal signs. He quotes authors who are advising vitamin B_1 (thiamine intravenously). N. B. Strauss, P. H. Salomon and H. J. Fox[5] have come to the same conclusion as Grinker: that is, that adequate liver therapy may prevent the development of spinal cord lesions in pernicious anæmia, or, if such lesions have appeared, they may be completely arrested by this form of therapy. F. H. Lewy[6] states that despite many hopeful reports in the literature, he has not been able to convince himself of a definite curative action even of excessive doses of liver extract upon the spinal phenomena. On the contrary, he has been under the impression occasionally, that while blood and general symptoms improved under liver injection, the spinal signs progressed.

The following is a description of a case of severe and rapidly progressing neurological signs in an elderly patient affected with pernicious anæmia, who showed improvement

after intrathecal administration of thiamine chloride.

A male patient, 75-years of age, was admitted to this Hospital on September 17, 1945. Approximately two or three months previously, he suffered from dizzy spells. He showed loss of memory, talked irrelevantly, was unreliable and, physically, was failing. At home, he complained about tingling feelings in his feet and hands, and was very tired.

He was under the care of his family physician, whose examination of the blood on two occasions showed a red blood cell count of 3,900,000, Hg. 70%, and 3,200,000, Hg. 68% respectively. Physical examination showed mainly weakness of legs, but no pathological reflexes. There was no reason on these former examinations to come to the conclusion that the patient was suffering from pernicious anæmia.

On admission, he was somewhat confused, helpless, disorientated and emotionally unstable. He was observed almost daily in spells which occurred at any time of the day. These consisted of general weakness, unconsciousness for seconds, associated with an outbreak of perspiration all over the body. They appeared characteristic of a cardio-vascular collapse, and during the attack, he was confused and did not know what happened.

Physical examination showed generalized moderate arteriosclerosis, and a blood pressure of 160/105. His heart was enlarged and his pulse, occasionally, irregular. Prostate was somewhat enlarged, irregular in size as well as in consistency. The neurological examination revealed the following: eyesight impaired; the retinal arteries were slightly narrowed and sclerotic. From the umbilicus downward, the superficial sensitivity became increasingly impaired, but was not completely absent. Vibratory sensitivity was decreased in this area: both lower limbs showed signs of spastic paraplegia. The patient was unable to walk. If supported on both sides, he presented a very spastic gait. Babinski reflex was positive bi-laterally. The skin was lemon-tinted.

The blood count on November 1, showed: red blood cells 1,940,000; Hgb. 44%; colour index 1.18; white blood cells 3,000.

He was given liver therapy by injection (reticulogen 4 c.c. daily), and received four blood transfusions, ranging from 250 to 500 c.c., covering a period of one and a half months. In spite of this intensive treatment, his neurological signs, as described above, became more pronounced. He became incontinent. His general condition declined gradually to the extent that he became almost moribund, and at this stage he was given thiamine chloride intrathecally.

The first injection consisted of 30 mgm. of crystalline thiamine chloride and was given on November 5. These intrathecal injections were repeated, the maximum dose being 150 mgm. and the first two injections were given within a week.

Immediately after each intrathecal injection, the patient complained of a feeling of warmth in the lower extremities, and his symptoms intensified transitorily, but this usually subsided within twelve hours, and from 24 to 48 hours later, he felt, on each occasion, a considerable improvement of these tingling sensations and muscular weakness of his lower limbs. The objective neurological signs also showed regression, the vibratory sensitivity being the first to improve.

As to liver therapy, for ten days, he received the original 4 c.c. of "reticulogen" (Lilly), but as he did not progress fast enough, we increased the dose to 5 c.c. a day. Several days later, it was again reduced to 3 c.c., then to 3 c.c. every second day. One month after the first administration of liver, he was put on a maintenance dose of 2½ c.c. three times weekly. His blood count has been maintained at a normal level, approximately: hæmoglobin 72%; red blood cells 4,400,000; colour index 0.9, together with a recession of the general and neurological signs and symptoms. The mental symptomatology which he presented on admission, and which became worse shortly afterwards, also improved.

The patient at the present time, (January, 1947) is up and around and feels very well. He still shows slight spastic and ataxic gait, and several objective neurological signs, but is now capable of supporting his own weight on his feet, and to walk unsupported.

SUMMARY

A case of pernicious anæmia, which showed mental and neurological symptoms as initial signs, has been described.

Liver extract and blood transfusions improved his blood picture, but failed otherwise. Neurological and mental signs, however, improved following intrathecal injections of thiamine chloride.

Theoretical consideration on the basis of this case, and the literature available, suggest that this therapeutic approach may present a basis for a better insight into pathological changes of the nervous system.

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RÉSUMÉ

D'après un certain nombre d'auteurs l'opothérapie hépatique entraine une amélioration sensible dans les cas d'anémie pernicieuse mais les complications nerveuses, une fois établies demeurent irréversible nonobstant cette forme de traitement.

On présente un patient souffrant d'anémie pernicieuse, âgé de 75 ans, avec signes nerveux du type pseudo-tabétique (sclérose combinée des cordons postérieurs et latéraux) et confusion mentale. A la suite d'injections intramusculaires d'extrait de foie en doses massive et de transfusions de sang la formule sanguine s'améliora mais les complications neuro-psychiatriques continuèrent de s'aggraver.

Le chlorure de thiamine en injection intrarachidienne réalisa une amélioration pronouncée dans l'état du patient. On se demande si cette forme thérapeutique ne fournirait pas une meilleure compréhension des modifications physiopathologiques du système nerveux.

SPECIAL ARTICLE

MEDICAL APPLICATIONS OF ARTIFICIAL RADIOACTIVE ISOTOPES

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INTRODUCTION

The innumerable compounds of which matter is composed can be broken down by ordinary methods of chemical analysis into 92 elements, whose distinctive properties are determined by the structural characteristics of their constituent atoms. The use of the familiar chemical sympols H, C, Na etc. implies that all hydrogen or carbon or sodium atoms are identical, but although this assumption is correct as far as can be determined by chemical methods, precise measurements of physical properties, such as mass, show that most elements are mixtures of 2 or more types of atoms, whose atomic weights are different, although their chemical behaviour is identical. Such variant forms of a single element are known as *isotopes*, and it is customary to differentiate between them by writing the appropriate atomic weight or *mass number* as a superscript at the upper right hand corner of the chemical symbol of the parent element. For example, hydrogen is a mixture of two isotopes, whose mass numbers are 1 (''ordinary'' hydrogen) and 2 (''heavy'' hydrogen), the corresponding symbols being H^1 and H^2, respectively. Similarly, oxygen is a mixture of O^{16}, O^{17} and O^{18}, while other elements have varying numbers of isotopes up to a maximum of 10 in the case of tin. However, 27 of the 92 elements have only one natural isotope, for example, Na^{23}, Al^{27}, P^{31}, Co^{59}, As^{75}, and I^{127}.

Without going into the complexities of atomic structure which have been described more fully in a recent review,[1] the physical basis for the existence of isotopes may be explained briefly as follows. The nucleus of an atom contains two kinds of particles, protons and neutrons, the chemical behaviour of the element being determined by the number of protons, while its atomic weight is equal to the sum of the number of protons and the number of neutrons. According to this concept, isotopes may be regarded as atoms in which a given number of protons is combined with varying numbers of neutrons, the number of isotopes of a given element being determined by complex natural laws which restrict the range of proton-neutron combinations which are compatible with stability. One of the striking paradoxes of nuclear physics is the fact that Nature seems to have disregarded her own laws by creating certain elements such as uranium, thorium and radium, whose nuclear constituents do not conform to the criteria of stability. These are the elements which exhibit the phenomenon of *radioactivity*, which is a form of spontaneous disintegration which eventually results in the tranformation of an unstable element into one of the stable forms.

The medical applications of the natural radio-elements such as radium are too well known to require further discussion, therefore this review will be devoted to the so-called *artificial radioactive isotopes*, which are man-made variants of the stable elements produced by forcibly altering their nuclear structure by bombarding them with sub-atomic projectiles in various ''atom-smashing'' machines. Since the usual result of such sub-atomic bombardment is to alter the neutron-proton balance beyond the prescribed stability limits, most of the 500 man-made isotopes are unstable, and exhibit the phenomenon of radioactivity in a form which differs in only a few minor respects from the natural process seen in uranium and radium.

The most striking property of all radioactive isotopes is the emission of *''rays''*, which are streams of nuclear fragments ejected with great energy as by-products of the spontaneous internal re-arrangements by means of which the atoms seek to attain stability. Although the details of the process of radioactive radiation are highly complex, it is sufficient for most practical purposes to differentiate between three types of rays, namely, alpha rays (α), beta rays which may be either positive or negative ($\beta+$ or $\beta-$), and gamma rays (γ). *Alpha rays* are streams of heavy positively charged particles which are given off by most natural radio-elements, and by about 1% of the artificial radioactive isotopes. They have high energy but very little penetrating power, therefore they produce great destruction of tissue, which is limited to a zone which extends only a few microns beneath the surface. *Beta rays* are streams of light charged particles which consist of ordinary negative electrons in the case of the $\beta-$ rays, and positive electrons or positrons in the case of the $\beta+$ rays. The biological effects of both types of beta rays are identical, the destruction of tissue being less intense than that produced by alpha rays, but the depth of penetration being increased to the order of a few millimetres. *Gamma rays* are not streams of particles in the ordinary sense, but merely pulses of electro-magnetic radiation, wihch are identical in physical properties and biological effects with high voltage x-rays. The outstanding characteristic of gamma rays is their great power of penetration, which allows them to pass without difficulty through the entire thickness of the human body.

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The energy of all three types of radioactive radiations is usually expressed in terms of a unit called the *million-electron-volt* (mev), which is defined as the energy acquired by an electron when it has been acted upon by an electromotive force of one million volts. The range of energy of the rays from artificial radioactive isotopes is from very small fractions of 1 mev to a maximum of about 12 mev. Rays of energy greater than 1 mev are usually considered energetic or "hard", and their detection and measurement is relatively simple, while rays whose energy is of the order of 0.1 mev or less are regarded as weak or "soft", since their measurement may tax the sensitivity of available measuring apparatus.

Since artificial radio-elements are almost always employed in unweighable amounts, they are usually measured in terms of the number of rays emitted per second; the detection of the emitted radiation being carried out by means of a Lauritsen electroscope or Geiger counter. The Lauritsen electroscope is a relatively simple apparatus which is merely a highly sensitive, stream-lined version of the familiar gold-leaf electroscope, while the Geiger counter is a highly complex electronic device, which has the important advantage of being able to detect the passage of individual α, β, or γ rays. When the number of rays emitted per second by a sample of radioactive material has been measured by one of these two instruments, the radioactive potency of the sample is expressed in terms of a unit known as the *curie* (c) which corresponds to 37,000,000,000 rays per second. The smaller quantities used in biological work are often expressed in millicuries (mc) or microcuries (μc), which correspond to 37,000,000 and 37,000 rays per second, respectively.

One of the most important characteristics of a radio-element is its *rate of disintegration*, which is determined by the basic law of radioactive decay. This law states that the number of atoms of a radio-element which disintegrate in any given second is a definite fraction of the total number of atoms present. The value of this fraction varies widely from one element to another, but is, otherwise, unaffected by any known chemical or physical agency. When the rate of disintegration of a radio-element is plotted graphically, as in Fig. 1, a typical exponential curve is obtained, and the most widely used method of specifying the rate of disintegration of an element is to determine its *half-life* by noting the time which is required for the amount of radioactive material to decrease to one-half of its original value.

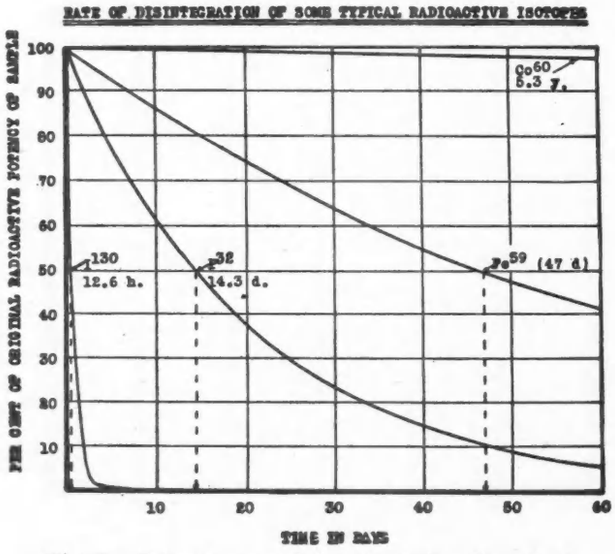

Fig. 1.—Decay curves of four typical radioactive isotopes. The most recent data on radio-iron gives the half-life of Fe^{59} as 44 days instead of 47 as shown in this figure.

The production of artificial radioactive isotopes is usually carried out in the cyclotron or the chain-reacting uranium pile. The cyclotron is essentially a laboratory apparatus, which is capable of producing small amounts of a wide variety of isotopes by bombarding stable elements with positively charged particles which have been accelerated to very high energies. The uranium pile is a large scale engineering project in which the process of nuclear fission is employed in order to convert uranium into plutonium for the manufacture of atomic bombs, but fortunately for science, one of the by-products of this process is the liberation of immense numbers of neutrons, which are extremely powerful agents for the transmutation of stable elements into artificial radioactive isotopes. Although the number of isotopes which can be made in the pile is much less than the 500 which can be produced by the cyclotron, the pile has the advantage of being able to produce very much greater quantities of a relatively small number of isotopes which include most of the ones of greatest biological importance. It is probable, therefore, that the pile will be the source of most of the isotopes used in the future, especially since details of the arrangements for distribution and allocation of pile-produced isotopes have recently been released by the U.S. Atomic Energy Commission.[2, 3] It is expected that a similar announcement will eventually be made by the National Research Council of Canada, when arrangements have been completed for the distribution of isotopes produced at the Chalk River Laboratories.

Applications of Artificial Radioactive Isotopes to Medical Research

The most important application of artificial radio-elements in medical and biological research involves their use as *"tracers"* in studies of the metabolism of a wide variety of substances, which can be rendered radioactive by synthesizing them in such a way that each molecule of the compound contains one or more atoms of a radioactive isotope. When

a dose of such "tagged" or "labelled" material is administered to an animal or to a human subject, the radioactive radiations which are emitted provide a sensitive method of determining the concentration of the substance in various organs and tissues in all phases of the metabolic cycle. As compared with the conventional "balance" experiment of ordinary biochemistry, the tracer technique has two important advantages, one quantitative and one qualitative. The quantitative advantage is due to the fact that the sensitivity of electronic methods of detecting radiation is great enough to allow measurements to be made on much smaller amounts of material than those which are required for ordinary microchemical analysis, so that experiments can be performed without increasing the concentration of the test substance beyond the normal physiological range. The qualitative advantage, which is even more important, depends on the fact that the radioactive tag provides a means of differentiating between the molecules of the administered material and the non-radioactive molecules of the same chemical compound which were present in the body at the start of the experiment.

In studying the absorption, distribution, and excretion of the tagged material, three different analytical procedures may be employed. The most widely applicable technique involves the use of a Lauritsen electroscope or Geiger counter to measure the radioactivity of serial samples of tissue, body fluids or excreta at various intervals after administration of the test dose. After allowance has been made for the progressive loss of potency due to spontaneous radioactive decay, one can calculate the fraction of the original dose which has been absorbed, distributed to various tissues, and excreted.

Another method of following the course of the radioactive material in the body involves the application of a Geiger counter to various portions of the intact animal or human subject. Although this method has obvious advantages of simplicity and convenience, especially for clinical applications, its use is largely restricted to those radio-elements which emit gamma radiations of sufficient penetrating power to enable them to reach the surface of the body in spite of the absorption caused by the overlying tissues. When beta-emitting isotopes are used, the method can therefore only be employed for the study of tissues within a few millimetres of the surface.[4] Moreover, even when the radiations have the necessary penetrating power, the measurements are only approximate, since it is impossible to differentiate between rays originating in different organs and tissues which lie beneath the area to which the Geiger counter is applied, except in a few fortunate cases where the radioactive material is selectively deposited in a single organ, as is the case with radio-iodine in the thyroid gland. However, measurements with the external Geiger counter are fairly satisfactory when the object of the experiment is merely to determine the time of arrival of the radioactive material in a given area, which is all that is required, for example, in the determination of circulation time.

The third method of tracing the injected radioactive material is the so-called radio-autograph technique, in which histological sections are placed in the dark in contact with a photographic plate for a sufficiently long time to allow the emitted beta rays to leave a permanent photographic record of the location of the radioactive atoms in the tissue sections. This technique is of little value for precise measurements of concentration, but it is the method of choice for histological and pathological investigations, in which the main objective is to study the location of the radioactive material in relation to the various types of cells in the tissue. The radio-autograph method has undergone repeated modifications and improvements since its introduction in 1940 by Hamilton,[5] and excellent coloured reproductions of the results which can be obtained by the latest refinements of technique are included in a recent paper by Belanger and Leblond.[6]

No matter which of these three analytical procedures is employed, the validity of the results of a tracer experiment hinges on the correctness of three assumptions which are inherent in the whole basic idea of tracer experimentation. In the first place, it must be assumed that the chemical and physiological behaviour of a molecule of a given substance is not altered by substituting an atom of a radioactive isotope for an atom of a stable isotope of the same element. In the second place, it must be assumed that the linkage between the radioactive tag and the labelled compound is stable for the duration of the experiment, since false conclusions would be drawn if the radioactive atoms became detached and were free to follow independent metabolic routes. Finally, it must be assumed that the intensity of the radiation emitted by the tracer dose of radioactive material will never reach a level at which significant pathological effects would be produced. There are satisfactory theoretical as well as experimental grounds for believing that the first of these three assumptions is substantially correct, but special precautions must be taken in order to achieve the necessary degree of stability in the tagging linkage,[7, 8, 9] and difficult calculations based on the physical properties and physiological behaviour of the isotopes must be made in order to determine the maximum safe tracer dose.[10 to 13]

DIFFICULTIES IN APPLICATION

The foregoing account shows that the basic principles of tracer experimentation are ex-

tremely simple, but this should not obscure the fact that formidable technical difficulties are likely to be encountered in all phases of any but the simplest tracer experiment. Great care must be exercised in the selection of an isotope whose half-life, radiation energy, availability and cost represent the best compromise with the theoretical requirements for an ideal radioactive tag. Moreover, even when a suitable isotope has been obtained, the problem of purifying the relatively crude products which are obtained from the pile, and the synthesis of complex organic compounds from the tracer element, may require prolonged research of a purely chemical nature before the radioactive phase of the project can be commenced. Finally, it should be appreciated that radioactivity measurements, even with the best available equipment, are inherently inaccurate, so that the method, though much more sensitive than conventional chemical analysis, is liable to much larger errors than would be tolerated in ordinary microchemical procedures. Perhaps the best commentary on the magnitude of the errors which may arise in radioactive measurements is to be found in a recent report which calls attention to the existence of a systematic error of more than 200% between the results of measurements of duplicate samples of radiophosphorus by two of the leading radioactivity centres in the United States.[13] It is probable, therefore, that the most satisfactory arrangement for the conduct of tracer experiments will continue to involve close collaboration between medical investigators and the staff of well organized radioactivity centres, whose physical facilities are capable of meeting the exacting requirements of this type of measurement.[9, 11, 12, 14, 15]

PRESENT STATUS OF TRACER RESEARCH

The following summary of the present status of tracer research is designed merely to give a general idea of the main types of investigation to which the new technique has been applied, therefore references to the literature will be limited to a few reviews, and a small number of reports which describe experiments illustrating some important principle of tracer technique. The simplest starting point for a review of tracer applications is a list, such as the one given in Table I, which presents data on the basic physical properties of some of the isotopes of greatest actual or potential import-

TABLE I.
CHARACTERISTICS OF SOME OF THE MORE IMPORTANT ARTIFICIAL RADIO-ELEMENTS

Element	*Isotope*	*Half-life*	*Energy of radiation in (Mev)*			*Production* in pile*
			$\beta-$	$\beta+$	γ	
Hydrogen	H^3	31 yr.	0.015			E
Carbon	C^{11}	20.5 min.		0.95		—
	C^{14}	6100 yr.	0.145			A
Nitrogen	N^{13}	9.9 min.	0.9		0.3	—
			1.2			
Oxygen	O^{15}	2.1 min.		1.7		—
Sodium	Na^{24}	14.8 hr.	1.4		1.4	A
					2.8	
Phosphorus	P^{32}	14.3 d.	1.69			B
Sulphur	S^{35}	87.1 d.	0.17			B
Chlorine	Cl^{38}	37 min.	1.1		1.65	—
			2.8		2.15	
			5.0			
Potassium	K^{42}	12.4 hr.	3.5			D
Calcium	Ca^{45}	180 d.	0.3			C
Iron	Fe^{55}	4-5 yr.			0.006	C
	Fe^{59}	44 d.	0.26		1.1	C
			0.46		1.3	
Cobalt	Co^{60}	5.3 yr.	0.3		1.1	B
					1.3	
Copper	Cu^{64}	12.8	0.66	0.58		C
Zinc	Zn^{65}	250 d.		0.4	1.14	D
Arsenic	As^{76}	26.8 hr.	1.1		0.57	C
			1.7		1.25	
			2.7			
Bromine	Br^{82}	34 hr.	0.47		0.55	C
					0.79	
					1.35	
Strontium	Sr^{89}	53 d.	1.5			A
Iodine	I^{128}	25 min.	1.85		0.4	—
	I^{130}	12.6 hr.	1.0		0.42	—
					0.74	
	I^{131}	8 d.	0.6		0.08	B
					0.37	

*Explanation of symbols in this column: A, always available; B, usually available on short notice; C, available on special request; D, can be produced only with great difficulty; E, not available until further notice.

ance from the standpoint of medical research. Isotopes such as radio-hydrogen (H^3) and radio-carbon (C^{14}) are included in the table because of their great potential value, in spite of the fact that technical difficulties are still delaying the widespread use of these isotopes in biological investigations. Data on the short-lived isotopes of oxygen and nitrogen are also included, merely to call attention to the fact that the absence of satisfactory radio-isotopes of these two all-important elements is one of the most unfortunate shortcomings of the tracer method. In addition to the elements listed in the table, scattered reports have appeared describing experiments with F^{18}, Mg^{27}, A^{37}, Mn^{54}, $Co^{55, 56, 57, 58}$, Se^{75}, $Kr^{79, 81}$, Rb^{86}, $Sb^{122, 124}$, and Hg^{197}, but more than 95% of the literature is devoted to less than a dozen radio-elements, namely, phosphorus, iodine, iron, sodium, potassium, chlorine, bromide, calcium and strontium.

Radio-phosphorus (P^{32}) is by far the most widely used radio-element, and several reviews have been devoted to the earlier experiments involving the use of P^{32} for metabolic studies in plants, animals and man.[16] In addition to the usual studies of absorption, distribution and excretion, radio-phosphorus has been used as a means of investigating phospholipid and phosphocreatine metabolism, and also for studies of the mineralization of bone. The tendency of radio-phosphorus to undergo selective localization in rapidly growing cells has suggested the possibility of its use as a means of differentiating between benign and malignant breast tumours,[4] and this same property has led to its use for the internal radiation therapy of polycythæmia and leukæmia. These therapeutic applications will be described in a separate section.

Radio-iodine (I^{128}, I^{130} and I^{131}) has been used to study iodine metabolism in the normal thyroid gland of animals and man, as well as in a wide variety of thyroid diseases.[17] The gamma rays of radio-iodine can be detected with an externally placed Geiger counter, so that measurements can be made on the intact patient as an aid to the differential diagnosis of Graves' disease, and as a means of assessing the completeness of thyroidectomy, and the functional activity of metastases from carcinoma of the thyroid. Miscellaneous tracer applications of radio-iodine, outside the field of thyroid physiology, include its use as a means of labelling plasma protein for the study of shock.[18] The therapeutic applications are described in a separate section.

Radio-iron (Fe^{55} and Fe^{59}) has been used by Hahn and his colleagues in the Rochester radioactivity group for an extensive series of investigations of various phases of iron metabolism and hæmoglobin formation. When radio-iron is fed to a human blood donor, the resulting radioactive red blood cells may be used as a means of studying the survival of stored or transfused red cells, and for the measurement of the mass of cells in the circulating blood volume. This latter technique has been widely used by the Harvard-M.I.T. radioactivity group.[10, 15]

Radio-sodium (Na^{24}), *radio-potassium* (K^{42}) and *radio-chlorine* (Cl^{38}) have been used in studies of absorption distribution and excretion of electrolytes,[19] and for the measurement of the volumes of intracellular and extracellular fluid. The gamma radiation of radio-sodium makes it suitable for use with an external Geiger counter for the measurement of circulation time, and for the study of blood flow in the extremities in peripheral vascular disease. Unfortunately, however, the half-lives of these three radio-elements are too short (see Table I) to allow them to be used for experiments of long duration, and their value as radioactive tags is still further reduced by the marked tendency of the salts of sodium and potassium to undergo electrolytic dissociation.

Radio-bromine (Br^{82}) has also been used for studies of absorption, distribution and excretion,[19] but its most interesting applications involve its use as a means of labelling vital dyes such as Evans Blue and Trypan Blue, both of which are capable of forming stable linkages with the bromide ion. Since radio-bromine emits penetrating gamma rays, an external Geiger counter can be used to study the selective localization of the radioactive vital dyes in inflammatory and neoplastic tissue.[21] A stable linkage can also be produced between radio-bromine and plasma protein, and the resulting radio-protein may be used as a tracer in the study of capillary permeability in burns and in shock.[8]

Radio-calcium (Ca^{45}) and *radio-strontium* (Sr^{89}) have mainly been used to study mineral metabolism in bone in normal ossification, in the healing of fractures, and in nutritional diseases such as rickets.[22] The therapeutic applications will be discussed in the next section.

Radio-sulphur (S^{35}) is of interest mainly because it can be synthesized biologically into radioactive protein, which can be used in the study of capillary permeability and related problems,[8] but the beta rays from this isotope are of such low energy that the radioactivity measurements are somewhat difficult.

Radio-carbon (C^{14}) is potentially the most valuable tracer element from the standpoint of medical research, because carbon is a constituent of so many of the most important biological compounds. However, in spite of the fact that large quantities of C^{14} can be produced by the pile, the widespread employment of this isotope for biological investigations will require the expenditure of a great deal of time and effort in order to develop methods of synthesizing complex organic molecules from simple inorganic carbon-containing compounds. In

addition, the measurements of the weak beta rays emitted by C^{14} presents a number of serious technical difficulties. The other radioactive isotope of carbon, C^{11}, is even less satisfactory for biological investigations on account of its short half-life of only 20.8 minutes, although a few experiments have been attempted with this isotope in connection with studies of photosynthesis and carbohydrate metabolism.

Radio-hydrogen (H^3) has many of the same potentialities as radio-carbon, but the use of this isotope involves difficulties in regard to synthesis and measurement which are just as great as those involved in experiments with C^{14}.

From the foregoing summary of the present status of tracer experimentation, it is evident that the great potentialities of the method are far from having been fully exploited at the present time, since only a few of the 500 artificial radio-isotopes have characteristics which fulfil the many stringent criteria imposed by the chemical, physical and physiological requirements of a satisfactory tracer element. Although many of the present restrictions will, undoubtedly, be removed by continued improvements in technique, it is unlikely that any considerable number of new isotopes with favourable tracer characteristics will be added to the list of the radio-elements which are now available.

THE USE OF ARTIFICIAL RADIO-ELEMENTS FOR INTERNAL RADIATION THERAPY

Ever since the discovery of radium, attempts have been made to obtain the beneficial effect of radiation by the oral or parenteral administration of radioactive substances, but the high toxicity of the naturally occurring radio-elements has prevented the successful application of this method of therapy. Recently, however, the availability of relatively non-toxic radioactive isotopes of most of the common elements has revived interest in the subject, and has resulted in a few practical applications.

The therapeutic possibilities of a radio-element depend on the extent to which it can be selectively deposited in the tissue which is to be radiated, because the use of a radio-element which is uniformly distributed throughout the body would produce serious systemic effects long before an adequate dose of radiation could be delivered to a local lesion. Other factors such as the half-life of the element and the energy of the beta radiation emitted must also be taken into consideration, but these factors are of minor importance as compared with the need for highly selective localization. Unfortunately, this requirement is only partially fulfilled by a very small number of radio-elements,[23] therefore the present record and future possibilities of this form of therapy are distinctly limited, in spite of the erroneous impression which has been created by recent ill-advised publicity in the press. At the present time, the only radio-elements with which significant positive results have been obtained are radio-phosphorus in polycythæmia and leukæmia, radio-iodine in hyperthyroidism and carcinoma of the thyroid, and radio-calcium and radio-strontium in metastatic bone carcinoma.

The therapeutic use of *radio-phosphorus* is based on the fact that this element tends to be selectively deposited in neoplastic tissue and other rapidly growing cells such as those of polycythæmia vera and leukæmia. However, the 1.7 mev beta rays of P^{32} can penetrate several millimetres of tissue, therefore the destructive action is not limited to the particular cells in which the radioactive atoms are deposited, but affects all elements of the bone marrow. This means that the dosage must be carefully controlled in order to avoid the usual manifestations of impaired bone marrow activity. Radio-phosphorus is usually administered orally or intravenously as a solution of disodium hydrogen phosphate in a total dose of 2 to 20 millicuries per patient.[24]

The best results have been obtained in polycythæmia vera, in which, according to the consensus of 8 authors who have reported 78 cases, radio-phosphorus therapy is more convenient for the patient, and slightly more effective in producing remissions, than the usual forms of treatment including venesection, phenylhydrazine, and x-ray therapy. It is generally agreed, however, that the drug does not cure the disease, because relapses are to be expected, and toxic reactions are fairly common even when the dosage is carefully individualized for each patient.

In chronic myeloid leukæmia (111 cases) P^{32} has produced palliative results similar to those of x-ray therapy, but there is no evidence of significant prolongation of life, while in 94 cases of chronic lymphoid leukæmia the results have been definitely inferior to those of x-ray therapy. Only slight questionable improvement has been noted in 41 cases of lymphosarcoma, and no beneficial results have been observed in 122 cases of acute leukæmia, 44 cases of Hodgkin's disease, 25 cases of multiple myeloma, and 22 cases of miscellaneous malignant tumours.

A few cases of leukæmia have also been treated with radio-sodium (Na^{24}), but this isotope is not selectively localized, and appears to be definitely less effective than radio-phosphorus.

The use of *radio-iodine* for the treatment of hyperthyroidism was suggested by the marked tendency of this isotope to be selectively deposited in the thyroid gland. Although only the most tentative conclusions can be drawn from the two series which have been reported during the past year,[11, 12] the results obtained to date are hardly impressive. Taking the two reports together, information is available on 51 patients who have been followed for 1 to 5

years. Of these, 36 were considered to have shown a satisfactory response as judged by a a fall of basal metabolic rate during a period of 1 to 4 months after administration of the radio-iodine. In 11 cases, the response was inadequate, presumably due to insufficient dosage, while the remaining 4 cases gave an excessive response, which resulted in a state of hypothyroidism or myxœdema. In addition, 5 of the 11 patients who gave an inadequate response to the initial course of radio-iodine also developed hypothyroidism, when a subtotal thyroidectomy was performed at a later date. In both series, the radio-iodine was a mixture of 90% I^{130} and 10% I^{131}, which was administered orally as a solution of sodium iodide in 1 to 4 doses totalling 0.7 to 24 millicuries in one series, and 18 to 147 millicuries in the other. As might have been expected, the lower dosage caused no radiation sickness but produced a high percentage of inadequate responses, while the higher schedule resulted in 6 cases of radiation sickness and 4 cases of hypothyroidism.

The use of radio-iodine as a means of controlling the growth of functioning metastases of an adenocarcinoma of the thyroid has recently been reported in a patient who was carefully followed for a period of several years.[25]

The only other reports of positive results with internal radio-isotope therapy deal with the use of *radio-calcium* (Ca^{45}) and *radio-strontium* (Sr^{89}) in a few cases of osteogenic sarcoma and metastatic bone carcinoma, but the results obtained to date do not provide much ground for hope that the prognosis of these diseases will be significantly improved by this form of therapy.

The Use of Artificial Radioactive Isotopes as Substitutes for Radium

In addition to their use for internal radiation therapy, some of the artificial radio-elements may be useful as substitutes for radium and radon for the ordinary superficial or interstitial radiation of accessible malignant tumours. Since the great majority of radium therapy involves the use of the 0.2 to 2.2 mev gamma rays of Radium C, it is reasonable to expect that similar results would be obtained with the 1.1 to 1.3 mev gamma rays of Co^{60} (see Table I), therefore it is probable that the use of radio-cobalt may prove to have certain definite practical advantages because of its relatively low cost and high rate of production in the pile. For the smaller number of cases in which superficial beta ray therapy is required, the most promising radium substitute would seem to be radio-phosphorus, and a series of articles on the use of this isotope for superficial beta ray therapy is now in process of publication.[26]

It should be emphasized, however, that there is no reason to believe that the use of artificial radio-elements will produce results which differ qualitatively from those of radium therapy, therefore the decision to change from one to the other will ultimately be made on the basis of practical considerations such as convenience, availability and cost.

Health Hazards Involved in the Use of Artificial Radioactive Isotopes

No discussion of the medical applications of artificial radio-elements would be complete without a word of warning on the potential radiation hazard to the investigators who use these materials, and to the patients into whom they may be injected for diagnostic or therapeutic purposes. The nature and severity of these harmful radiation effects will vary widely from one radio-element to another, and will be determined by the nature and energy of the radiations emitted, the amount of material involved, the route by which it comes in contact with the body, and such physiological factors as the sites of selective localization, and the rate of elimination of the element. However, depending on the circumstances, the radiation effects which can be produced by artificial radio-elements cover the entire gamut of cutaneous, hæmatological, gonadal, systemic and lethal effects of radium and x-rays.

Since it has been shown that the health hazard of radium and x-rays can be completely controlled when these forms of radiation are employed by qualified personnel in accordance with a rigid safety code, the only reason for anticipating the development of a serious health hazard in the use of artificial radio-elements lies in the fact that their availability in increasingly large quantities for a wide variety of research and therapeutic applications will result in their use by a larger and less radiation-conscious group of physicians than the professional radiologists. The Isotopes Branch of the U.S. Atomic Energy Commission has set an admirable example by insisting on the appointment of special Radioactivity Committees in all institutions to which distribution of pile products is authorized,[2] therefore all that is required to prevent the repetition of the unnecessary tragedies of the early days of radium is a reasonable amount of co-operation from the individual investigator. No one should undertake work in this field until he has familiarized himself with the potential radiation hazards of the material which he intends to use, in order that he may institute such safety measures as may be required to prevent the record of this valuable new investigative weapon from being marred by the occurrence of unnecessary accidents.

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CLINICAL and LABORATORY NOTES

RELIEF OF POSTANÆSTHETIC VOMITING THROUGH PYRIDOXINE

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In small hospitals ether is still widely used as the anæsthetic of choice for general surgery. Ether is easy to give, carries a low mortality, and it can be given by nurses and other not especially trained anæsthetists.

The drawback of ether is that in almost every case postoperatively the patient goes through a more or less prolonged phase in which he is nauseated and vomits. This brings on tension on the freshly made operative wound, and causes the patient pain and discomfort.

Several combinations of preanæsthetic medication were tried during the last two years in an effort to decrease or abolish this nausea; such as combinations of nembutal with morphine-atropine, nembutal with demerol, nembutal alone, nembutal with atropine alone, all without any effect at all. Finally, on the basis of the efficient action of pyridoxine in vomiting of pregnancy, injections of pyridoxine were given before operation was started and an immediate effect was noted: no more vomiting occurred, and nausea was slight. The method was tried out in a consecutive series of 12 cases, with a similar one as control.

The cases consisted of 8 appendectomies, the age ranging between 5 years and 47; 2 removals of cystic ovaries and tubes; one ventral hernia, and one cysto-rectocele. The average length of the operation was one hour, and the average amount of ether used was around 3 tins of ¼ lb. None of these patients vomited at all, a few of the first cases showed slight nausea. Each one of the control series, where the operation lasted a similar time and similar amounts of ether used, vomited at least a few times and everyone was nauseated. The preoperative medication consisted of nembutal gr. 1½, morphine 1/6 to 1/8, atropine 1/150 to 1/250, and was similar in both series.

After the first cases, in which only one injection of 100 mgm. pyridoxine was given, the routine was changed to one injection of 100 mgm. pyridoxine before the operation and one injection of 100 mgm. pyridoxine one hour after the operation.

It seemed that the patients receiving pyridoxine, got on very much better than the ones not receiving pyridoxine, and patients were ambulatory usually on the second and third day postoperatively, with full bathroom facilities, while the control series was only ambulatory around the third and fourth day.

CONFUSION IN TYPING STORED BLOOD*

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Our attention was recently drawn to a report by Fruin[1] in which it was alleged that a hitherto undescribed latent irregular isoagglutinogen is present in about 25% of human bloods. This isoagglutinogen was said to become active after cells had been stored in saline for periods greater than 48 hours and consequently to give rise to confusion in typing. Cells initially shown to be group O became group A and finally group AB. More rarely group O blood first became group B and later group AB.

According to Fruin, the phenomenon was shown to be other than that due to cold agglutinogens since it occurred at 37° C. Moreover, washing the cells failed to influence it; so that it was not considered to have been the special type of cold agglutinogen known as an auto-agglutinogen. Nor was it thought to be the Thomsen phenomenon (due to bacterial contamination) for many of the suspensions were apparently sterile; and in those cases from which organisms were grown, infection of fresh cell suspensions with the bacteria failed to result in group changes within 24 to 36 hours at room temperature, such as would have oc-

* From the Laboratories of the Mountain Sanatorium, Hamilton.

curred were it that particular phenomenon. As is the case of the Thomsen phenomenon, however, the cells did agglutinate with their own serum. Inoculation of a fresh cell suspension with three drops of the suspension showing an agglutinogenic reaction led to the conversion of only 25% of the new cell suspensions to type AB; and that was the same as the percentage of uninoculated suspensions observed to develop the change spontaneously. It was thus inferred that transference of an organism did not occur.

It has been customary at the Mountain Sanatorium to store cells for subsequent typing in saline as a 3% suspension. After several years of this practice we had never encountered or, perhaps more correctly speaking observed, any such group changes as have just been described. Furthermore, on enquiry at other hospitals employing saline suspensions it was learned that the phenomenon had likewise not been noted. In view of the fact that it was desirable to continue the use of saline because of the particular arrangements for donors at this hospital, it was decided to run experiments to confirm or disprove the presence of a latent irregular isoagglutinogen.

One hundred consecutive blood samples were made to 3% cell suspension in normal saline, prepared from saturated brine as described by Moerke[2] and, after preliminary typing, were stored at 40° F. On each of ten consecutive days the cells were rechecked as to A and B agglutinogens. In no instance was a change in grouping observed.

A second experiment in which twelve blood suspensions, prepared with aseptic precautions, were kept at room temperature yielded the same result.

Just as these experiments were being concluded an example of what appeared at first to be Fruin's phenomenon came to our notice. The cells* in the saline tube accompanying a bottle of bank group O blood were found to agglutinate as group AB. The cells within the bottle were definitely group O. The donor's serum agglutinated the altered cells. However, there was this difference between our findings and those of Fruin, *viz.*, that addition of a few drops of the suspension of altered cells converted fresh group O cells to group AB within 24 hours at room temperature. Also, within the same time, fresh cell suspensions made from the bottle blood changed to a weak group AB (without the addition of changed cell suspension) when kept at room temperature (but not at refrigeration temperature). There was no evidence of gross contamination and bacteria could not be found microscopically. Cultures were not made, since the material was known to have been exposed at least to air contaminants.

Shortly after this incident a similar example was encountered. A saline suspension of group A cells, transmitted to another laboratory (for checking of Rh factor) was reported by that institution to be group AB. In this case further studies with these cells could not be made, but a fresh suspension from the original bottle later changed to AB within 24 hours in the refrigerator.

Fresh blood was obtained from both the donors, but making a saline suspension of their cells this time failed to bring about any group change.

The findings suggest that the phenomenon which we observed was that known as the Thomsen phenomenon even although no organisms were seen. Contamination may have been due to very small and perhaps slowly growing organisms. It is interesting that the agent bringing about the change was apparently present in the main bottle blood although in a latent state.

The British transfusion authorities[3] have for years stressed the desirability of the performance of agglutinations and cross matchings on fresh cells, taken either directly from the donor or from the blood bank bottle; accessory tubes are never attached to the bottle. We are now informed that this is to be the practice of the newly organized Canadian Red Cross Society Blood Donor Transfusion Service. On the other hand, many American and Canadian blood banks have ignored the Thomsen phenomenon and have trusted to aseptic technique and refrigeration. But this can scarcely be a safe procedure since, as is well known, there are species of bacteria which grow well at low temperatures.

Discussions with those in charge of blood banks at first generally failed to elicit evidence that group changes of cells stored in saline have ever been observed. Further questioning has always revealed that instances, considered at the time as technical or clerical errors, can be recalled. How often these changes have been noted by technicians making cross matchings with blood bank blood, who would consider the phenomenon an error in their own original typing and who, therefore, would not likely draw them to attention is difficult to estimate.

Our experiments failed to confirm the presence in human blood of the irregular isoagglutinogen described by Fruin. They did, however, stress the importance of performing cross matching with cells freshly obtained from the blood bank bottle or donor. It was with the purpose of drawing this to attention again that these notes have been prepared.

* As is the common practice with blood banks on this continent, to each bottle of blood from the local blood bank there is affixed a tube containing 3% saline suspension of cells and another tube containing serum from the donor.

The authors wish to thank Dr. C. H. Playfair, Medical Superintendent, for permission to carry out this study and gratefully acknowledge assistance from Dr. W. S. Stanbury, M.B.E., Assistant National Commissioner, Canadian Red Cross Society Blood Donor Transfusion Service, from Dr. W. Anderson, and from Mr. F. J. Elliott, technician-in-charge of City Hospital blood bank.

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VENEREAL DISEASE CAMPAIGN

Cases of Venereal Disease in Canada Reported by Provincial Health Departments to the Dominion Bureau of Statistics, 1944, 1945 and 1946

	1944	1945	1946
Total V.D.	38,772	40,528	41,569
Total syphilis	16,475	15,279	15,228
Gonorrhœa	22,282	25,237	26,288
Ratio gonorrhœa to total syphilis	1.4	1.7	1.7

In the past year 41,569 cases of venereal disease, all types, were reported by Provincial Health Departments to the Dominion Bureau of Statistics. Among these 26,288 were cases of gonorrhœa and 15,228 were syphilis, all types. The ratio of gonorrhœa to total syphilis was, therefore, 1.7 to 1.

From experience gained with the reporting of venereal disease in the three branches of the Armed Forces in Canada, from 1940 to 1944, it was noted that the ratio of gonorrhœa to total syphilis was approximately 6 to 1. This is supported by the finding that in the United Kingdom, among British troops stationed there, the ratio of gonorrhœa to total syphilis for the year 1942 was 8 to 1.

It would not seem unreasonable, therefore, to view the ratio as encountered in the Canadian Forces as a conservative indication of the relative frequency of occurrence of these infections among the entire population of Canada. Upon examination of this ratio for 1946—1.7 to 1—it is obvious that there exists a marked discrepancy in reporting, especially in the case of gonorrhœa, since a high percentage of patients suffering with syphilis attend the provincial V.D. clinics, where reporting is routinely carried out.

At this time a particular effort is being made to improve the reporting of all types of venereal disease by physicians. In the long run this will well repay the time and energy devoted to it by enabling those having to do with the administration of venereal disease control programs to have available dependable information on the extent of the problem in each province and to plan the necessary measures which will best assist practising physicians in their continuing efforts to control venereal diseases.

EPIDEMIC INFLUENZA.—Speaking on "The Study of Epidemic Influenza" at the Royal Institute of Public Health and Hygiene on February 19, Professor C. H. Stuart-Harris said that the modern study of influenza had begun fifteen years ago with the first laboratory transmission of the disease to the ferret. Technical advances since then had brought the study of the influenza virus within the scope of most well-equipped laboratories. Of chief importance had been the proof of the existence of two independent influenza viruses, A and B, and the utilization of the allantoic and amniotic cavities of the chick embryo for cultivation of the virus and demonstration of its specific hæmagglutinin (Hirst phenomenon). Epidemics of influenza were studied in order to demonstrate the type of virus concerned and to differentiate influenza from outbreaks of other types of respiratory tract disease. In the past epidemics of influenza virus infection among semi-isolated communities had exhibited a striking variation in incidence, being sometimes a few sporadic cases and at other times explosive outbreaks. When the incidence of influenza in the general population was studied by means of mortality statistics a correlation was found to exist between widespread epidemics and the demonstration of influenza virus infection in the laboratory. There was evidence of a periodicity of influenza virus infection with cycles at well-defined intervals. Thus some power of prediction of the likelihood of future epidemics now existed, but the intensity of the future outbreak was still a matter of conjecture. Experimental study of influenza by the inoculation of human volunteers with cultures of influenza virus had been developed considerably during the war both in order to yield information concerning immunity and as a test of the efficacy of artificial immunization. The results provided a basis for field trials of immunization in advance of epidemics of influenza, and the success of these trials had suggested that influenza was a preventable disease.

Organization of the Canadian Heart Association.—A group of Canadian physicians who are interested in the study of cardiovascular disease, will meet to organize a Canadian Heart Association during the course of the Canadian Medical Association Meeting in Winnipeg. This group will meet at the Fort Garry Hotel on the afternoon of June 24. Dr. John Hepburn, 726 Medical Arts Bldg., Toronto, and Dr. Harold N. Segall, 417 Medical Arts Bldg., Montreal, are the temporary secretaries.

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EDITORIAL

CURARE IN TREATMENT OF POLIOMYELITIS

THE tightness of muscles that occurs in poliomyelitis must not be confused with the spasticity resulting from pyramidal tract disease. In poliomyelitis the tightness is due to a shortening of the muscle, and there may be tenderness and pain on stretching, especially in the acute stage. It is this tightness which has received so much attention in the Kenny school of thought, whilst it used to be before considered as little more than a transitory phenomenon. There is as yet no convincing evidence for or against the presence of a lesion in the muscles themselves. It may be said however that at least part of the muscle spasm has its origin in lesions in the brain stem.

In any case the tightness demands attention, since if prolonged, it may become such a crippling element. The value of warmth requires due recognition, but it cannot be regarded as an infallible method of treatment. In search for other methods Ransohoff tried curare, depending of course on its relaxation effect. He reported[1] striking effects, particularly in his first cases. He found that by passively and actively stretching the muscles after administration of curare the degree of disability was materially reduced. In bulbar cases respiratory difficulty was relieved and swallowing made easier. Fox[2] however in a series of 34 patients did not obtain similar results, and concluded that curare might help in some cases but was dangerous and should not be encouraged in the treatment of the acute stage of poliomyelitis.

Richards, Elkin and Corbin of the Mayo Clinic now report[3] their experience with curare in a series of 18 patients. The curare in the form of intocostrin (Squibb) was given both intravenously and intramuscularly, and in each case, after estimation of the degree of tightness by a method evolved for the purpose, stretching was carried out through the full range of motion as advocated by Ransohoff. The pain and resistance in most cases was too great to permit of this and no marked improvement could be seen. Curare in oil was tried in an attempt to obtain a prolonged effect and to avoid repeated injections, but no particular benefit was noted. In seven patients pentothal was given with the curare to permit of the maximum stretching of the muscles which could not be attained with curare alone. Whilst the muscles thus stretched were not painful afterwards, it could not be decided that they had been benefited by it. The least to be said was that no harm resulted.

The conclusion was that curare did not seem to materially affect any aspect of the clinical course of poliomyelitis. It did not prove to be a dangerous drug, but it should not be used unless the proper methods of combating possible untoward effects are at hand.

1. RANSOHOFF, N. S.: *J. Am. M. Ass.*, **129**: 129, 1945.
2. FOX, M. J.: *J. Am. M. Ass.*, **131**: 278, 1946.
3. *Staff Meet. Mayo Clin.*, **22**: 31, 1947.

EDITORIAL COMMENTS

Medical Films

Medical teaching is making increasing use of films, but up to the present there has been no organized endeavour to fit film production to the medical curriculum in Canada. Although excellent films have been made here and abroad by commercial concerns with the close co-operation of the profession, most of the activity in this field has been carried on by private individuals and institutions.

The first attempt at co-ordination on a national basis is now being made by the recently formed Medical Committee of the Canadian Scientific Film Association. This body will have representation from the main medical organizations in the country, and will somewhat parallel the collaboration of the Royal Society of Medicine with the Scientific Film Association in the United Kingdom in surveying and co-ordinating medical film activities there.

One of the C.S.F.A. Medical Committee's first tasks will be a survey of existing medical motion pictures of Canadian production. This survey will meet a long-felt need and will also assist in the expansion of the medical film library brought together by the National Film Board. The Committee recognizes that there are many films of teaching and historic interest

whose use should be more widespread, and it solicits information on each and every medical film produced in Canada. It is hoped that much dormant film footage will be uncovered.

The cataloguing of all existing medical films is the indispensable first step towards bringing about an orderly development in this field, and those members of the profession who have made or possess medical motion pictures are forthwith urged to communicate with: The Medical Committee, Canadian Scientific Film Association, 172 Wellington Street, Ottawa, Ontario.

The National Cancer Institute

The work of the National Cancer Institute of Canada is steadily developing both in organization and initiation of future activities. The meeting of the Interim Committee on March 4 decided that the Head Office of the Institute should be located in Ottawa, its present address being Room 720, Jackson Building, Bank Street.

The King George V Silver Jubilee Cancer Fund Trustees have authorized a grant of $450,000 to the Institute to be used within a period of three years. This should give the Institute an initial success which may be followed up with an extensive campaign, and perhaps some Government assistance will be requested.

The Interim Committee authorized the Executive Director together with one or two others to make an extensive survey of all cancer treatment and research facilities either at present available or contemplated within the Universities of Canada.

Perhaps the greatest problem in joining the battle against cancer is the scarcity of young scientific workers whose work might be directed into the field of cancer research. The program has made provision for a number of Fellowships to give these young workers a livelihood while they are being trained to conduct independent research.

Rheumatic Fever

The gradual focussing of public attention on rheumatic fever as one of the most serious diseases of childhood is well exemplified in a recent booklet issued by the American Council on Rheumatic Fever of the American Heart Association.* Written in popular style it states the essential facts with a clarity and accuracy which should be of interest and instruction even to the technically trained. Possibly the most difficult aspects of the disease are the insidiousness of onset and chronicity. These are bad enough from the medical point of view of diagnosis and treatment, but they also serve to mislead the judgment of the laity in realizing the true menace of the disease. The same factors have operated with the same result in pulmonary tuberculosis. Continued campaigning has had some effect in improving the attitude of the public towards that disease, but what success has been attained has been only at the expense of unceasing effort. In rheumatic fever there have been and are publicity programs of great value, and these too need incessant and varying reiteration.

The present pamphlet is an excellent example of this type of effort. It should be of great value to all who write or speak on the public health aspects of rheumatic fever.

* Rheumatic Fever—Childhood's Greatest Enemy: Herbert Yahraes. Bulletin No. 126 issued by Public Affairs Committee, Inc., 22 East 38th St., New York, N.Y. Price 10c.

MEDICAL ECONOMICS

THE ROLE OF THE HOSPITAL IN MEDICAL ECONOMICS

Harvey Agnew, M.D., F.A.C.P., F.A.C.H.A.

Toronto, Ont.

With the development of the organization and function of the hospital, it has assumed a rôle of steadily increasing importance in the practice of medicine. Each year the medical profession is relying to a greater extent upon the diagnostic and therapeutic facilities of the hospital. Already it has played a significant rôle in medical economics and this rôle should increase.

Its influence on medical practice has been profound. Modern surgery would not have been possible without hospital facilities. Not only has it permitted the surgeon to do intricate work not otherwise possible, but it has relieved him of a tremendous amount of costly and time-consuming detail in connection with the preparation of the patient, the setting up of the operating room and the after-care of the patient. Almost the same could be said in relation to care in obstetrics and other clinical fields.

Hospitals are becoming the diagnostic centres in most communities; few doctors, except those practising as large groups, can provide the extensive diagnostic facilities found in the modern hospital. An increasing proportion of admissions are for diagnostic study, although during the last few years of widespread bed shortage there has been some temporary curb on this custom. By grouping patients in one building, doctors can see more patients in a given time and can have their work per patient considerably reduced. Large hospitals with ward services and out-patient departments relieve the individual practitioner of much of the indigent work of the community. It is not many years since all but the major hospitals expected each doctor to supply practically all of his own instruments and even his own gloves

and gowns; now only very special instruments are supplied by the surgeon.

In other words, thanks to the facilities provided through the hospital, the doctor's earning power has been greatly increased and his personal or office overhead for diagnostic equipment, nurse and other assistants and for instruments has been markedly reduced.

WHAT OF THE FUTURE?

Looking ahead, certain of the trends are so clearly indicated that one does not need to be the seventh son of a seventh son to risk betting a new hat on what is just around the corner. True, other possibilities are not so clearly indicated and one ventures a prophecy in these instances with some temerity.

1. *Still more medical work will be done in hospitals.*—Several reasons are obvious. (*a*) Both diagnosis and treatment are yearly becoming more intricate and requiring more elaborate equipment and specialized personnel which are only feasible, from an economic viewpoint, in the hospital. (*b*) Health legislation and voluntary plans providing hospital benefits will stimulate the hospitalization of patients; *e.g.*, the free hospitalization of maternity patients in Alberta, obligatory prepaid hospitalization for all residents of Saskatchewan starting January 1, 1947; nearly a million and three-quarters of our people in Canada are now under voluntary prepayment hospital plans, the leading five plans in Canada being known as "Blue Cross" plans because they are among the 87 which have been approved by the Blue Cross Commission of the American Hospital Association; some eight hundred thousand people are enrolled in the Plan for Hospital Care in Ontario. (*c*) Poor housing conditions and lack of domestic help make it almost obligatory in many instances to utilize the hospital facilities.

From the viewpoint of medical economics, the effect upon the medical profession of this increased use of hospitals will depend upon whether the hospital bill is to be paid by the patient or through some central fund, voluntary or governmental. If paid by the patient, the doctor's bill has serious competition and its payment may be seriously delayed; it is surprising that some doctors still oppose properly controlled prepayment plans. If paid by some central funds, it should be much easier for the doctor to collect his own account. This has been the case where Blue Cross plans have been developed. There is a distinct trend for more and more patients to have their hospital bills paid by some other source than themselves; studies have shown that over half of the patients in general hospitals over large areas, and frequently a much higher percentage, have their accounts paid by other than the individual or the family at the time of illness; ultimately this may apply to practically all patients, as is now the case in Saskatchewan. The ultimate effect should be an economic gain to the medical profession, unless other parallel developments have an over all deleterious effect.

2. *Central diagnostic centres may be anticipated.*—One of the greatest difficulties today is to obtain the best possible diagnostic study and interpretation at a reasonable cost. In most rural areas the difficulties are tremendous and a costly trip to a distant city is often needed. Even in large centres, the costs are a serious burden to most patients whether they are admitted to a hospital for a checkup or make the rounds of specialists' offices. The public fully realizes that if good diagnoses could be obtained earlier and at a reasonable cost, much suffering and later expense could be saved and in many cases unnecessary deaths, as from cancer, avoided.

The present plans in Manitoba, Saskatchewan, Alberta and elsewhere in this country, the program in England, and the success of tuberculosis and other diagnostic clinics here and abroad indicate that sooner or later we may anticipate special and general diagnostic clinics in strategic centres. If compulsory health insurance is adopted generally, one would anticipate that the present out-patient departments as such would be rendered unnecessary, and, in that case, many of them might be converted into diagnostic clinics, for insurance plan subscribers, possibly with a paid medical staff working on a full-time or part-time basis, depending on the extent of the clinic, and with the patient referred back to the private physician for treatment. The effect of these changes on medical practice is obvious.

3. *More doctors may have their offices in hospitals.*—For some years back an increasing number of doctors have been seeing private patients in offices at some of our hospitals. In some cases these have been clinical teachers practically on full-time but devoting an hour or two to private work. In other instances, although conducting an extensive private practice, they have found it necessary to spend so many hours at the hospital each day that it has been a distinct convenience to have office facilities there. A number of hospital building committees are now planning extensive office suites for staff doctors in future hospital construction. In quite a few small hospitals the local doctor, or doctors, find it convenient to practise right from the hospital.

This would seem to be a logical development as more and more of the doctor's work centres in the hospital. The B.M.A. Planning Commission's proposal that doctors form groups of eight to twelve and have joint offices, diagnostic and library facilities, even though they practise as individuals, has much merit, as centres of this type would reduce overhead and result in more efficient and satisfying conditions of practice.

In many towns and smaller cities these office centres could readily develop as part of the hospital itself, still further reducing time loss and duplication of equipment and telephone coverage. In larger cities the offices in a hospital would more likely be taken at first by those giving most time to the hospital and by consultants.

4. *More full-time doctors.*—There is quite a noticeable trend for well-organized hospitals, particularly teaching hospitals, to employ heads of departments or directors of medical activities on a salaried basis. This has been a common practice in Germany for many years and more recently in some of the larger hospitals of the United States and Great Britain. The arrangement does seem to give more efficient service, particularly as better organization and more continuity is assured. With the development of hospitals as centres of clinical and laboratory research, more extensive long-range programs of study can be developed by this arrangement. In the case of hospitals connected with a medical school, the necessary integration of educational objectives with clinical resources is facilitated.

The staffs of some hospitals in Great Britain are being paid to a certain extent and it is quite likely that this idea of remuneration for service rendered will be extended. The younger doctors do not seem to be as keen about giving so much of their time and energy without reward as were their elders, although their elders, too, changed much of the old order during the depression years.

5. *Greater staff restrictions?*—Whether this possible trend towards salaried staffs would result in a greater restriction of hospital staff membership is of considerable moment to the practising profession. One would not like to see repeated here the set-up in Germany where only a few doctors have had appointments in the large hospitals. To be without some hospital connection these days is indeed a serious handicap in practice, for without hospital privileges a doctor is like a craftsman without a workshop. On the other hand, it is generally agreed that a closed staff of carefully selected, highly trained individuals can accomplish more effective work.

But this is not the whole picture. In the final analysis the criterion is the over-all effect upon the health of the community. If one's viewpoint is limited to what goes on within the hospital, a carefully selected closed staff may well provide the best possible type of care. But what about the patients treated elsewhere? As long as medicine is practised as it is at present, practitioners cannot be expected to suffer economic loss and personal prestige by turning patients over to others with hospital privileges, especially if they feel quite competent to diagnose and treat those patients themselves. The natural result of such an arrangement would be the setting up of a number of proprietary or "private" hospitals where these doctors could do their own work. Proprietary hospitals, as a class, but with many individual exceptions, have given Provincial departments of health considerable concern, for all too often they are inadequately equipped and seldom have a medical staff organization or any real control of work undertaken. Provincial departments of health do supervise them for sanitary arrangements and for fire protection, but limited departmental staffs and budgets do not permit them to check the professional work except on occasion. Proprietary hospitals are conspicuously absent from the lists of Canadian hospitals whose professional organization and work have been approved by the American College of Surgeons. Private hospitals fill a real need in small communities without voluntary or municipal hospitals, but one would not like to see their number augmented elsewhere, as would be the case if all public hospitals in larger centres were "closed".

It is hoped that we would evolve a system that would give every general practitioner and specialist in good standing *some* connection with a general hospital of repute, but which at the same time would permit sufficient control or supervision of the work done to assure the public of the best possible care at all times. In other words, we should endeavour to retain the best features of both the open hospital and the closed hospital.

In larger centres this might constitute membership of all local doctors in good standing on the courtesy staff of one or more of the hospitals. In small centres this would mean including on the courtesy staff practitioners from neighbouring towns and villages. However, this privilege, usually limited to the care of paying patients, should not be an unlimited one. It is being realized to an increasing extent, although not always practised, that *all* work done in hospital, especially if of an operative nature and whether done by members of the active, courtesy or consultant staff, should be subject to the general approval of the respective departmental head or committee.

HOSPITALS OVERCROWDED

At the present time our hospitals are badly overcrowded and, in every Province, there is much need for an expanded building program, not only of hospitals for active treatment but of facilities for other types of patients—the chronically ill, the convalescent, the tuberculous, the mentally ill and the patient with communicable disease. The situation is deteriorating badly, for little construction took place during the war and now committees hesitate to build because of the high cost, the scarcity of materials and the none-too-expert or efficient workmanship. Not only do we need more accommodation but we must replace much of

what we are now using for it is fast becoming obsolete.

THE NEED

It is not easy to estimate the number of beds needed across Canada, for the figure would be influenced by so many factors. Moreover, what we need today will probably prove quite inadequate a decade hence if the present developments towards health insurance in the west and the opinion of large groups elsewhere lead to a general extension of legislature in that direction. However, our office has drawn from various studies and other sources to make the following estimates of new accommodation needed *if we are to fully meet our needs.*

NEW BEDS REQUIRED

	Needed now	*Additional beds needed during next decade*
Active	8,000	9,000
Bassinets	1,200	1,000
Isolation	1,800	..
Tuberculosis	7,500	..
Mental	8,500	7,000
Chronic	13,500	2,500
Convalescent	2,200	500
	42,700	20,000

These figures do not include D.V.A. or other Dominion hospitals, nor do they include private hospitals which would be rendered unnecessary to a large extent if adequate public hospitals were available.

We are particularly short of adequate facilities for the *chronically ill* and the *incurable.* Although the demand in recent years for beds for the acutely ill has minimized the retention of long-stay patients in general hospitals, there are still many patients in these hospitals who could be treated in less costly institutions. In this connection, present-day thought would favour the housing of these patients, not in a separate hospital for the chronically ill across town where they would seldom be seen, but in a special building on the general hospital grounds where adequate medical oversight and treatment facilities would be available and where costs could be still further reduced by the use of joint service facilities.

Convalescent care and rehabilitation have been sadly overlooked in our planning. We have only a few convalescent hospitals in the whole of Canada and several Provinces have no facilities at all. Proper convalescent care means more than just two eggs for breakfast, a backrest and a 29-cent thriller; it means carefully planned rehabilitation measures to avoid relapse and to ensure speedy recovery to normal health and full functional activity. This in turn implies the use of physical therapy, occupational therapy, dietotherapy and all that goes to speed recovery. Such a program of rehabilitation can be done only in centres large enough to make the economic outlay feasible; therefore, unlike facilities for the care of the chronically ill, which should be set up in almost every county or comparable area, convalescent institutions as we now conceive them might well be located, for the present at least, in or near large centres only.

THE POSSIBLE COST

This estimate of our need constitutes a tremendous order. It is not at all likely that we shall obtain more than a portion of the beds needed. But extensive construction must be undertaken and without delay, too. Presuming that we could proceed with this program of construction, what would be the cost? Costs of additions and replacements vary considerably, depending upon the durability of construction, the extent of the facilities provided, the possible inclusion of boiler plant, kitchens, laundry and other service facilities in addition to patients' rooms and other factors. Whereas excellent facilities could have been erected for 55 to 60 cents per cubic foot before the war, comparable construction today costs from $1.00 to $1.30 per cubic foot. On a bed basis present day construction runs from a low of perhaps $2,000 per bed for lightly built, poorly equipped facilities to $10,000 or higher. Construction authorities place an average and conservative estimate of $5,000 per bed for the construction of active treatment hospitals and $4,500 for other types of hospitals.

This basis has been considered too high by some doctors and building committees but is considered very conservative by well-informed hospital architects and contractors. Undoubtedly many features of our specifications could be eliminated, but when we get down to details where do we start? Plumbing, acoustical treatment, signal systems, special laboratories or conference room? Good technique prevents many economies; other features, such as terrazzo floors, monel finishes and labour-saving devices are an ultimate economy because of reduced replacements and the resultant reduction in high labour for maintenance. The Commission on Hospital Care in the United States in estimating the cost of new construction, has worked out an average there of $9,200 per bed.

Utilizing the figures of $5,000 and $4,500 given above the following is an estimate of the cost of the construction needed here.

ESTIMATED COSTS

Now	
Active hospitals	$ 44,000,000
Other hospitals	150,750,000
Additional (within ten years)	
Active	49,500,000
Other	45,000,000
	$289,250,000

ENORMITY OF TASK

The object of presenting these astronomical figures is to indicate the enormity of the task of raising these funds. To be candid, private philanthropy cannot do it. The state—Dominion, Province or municipality—must contribute the major portion of capital cost if hospital facilities are to be adequate.

This has been realized for some time in several of the Provinces, notably Quebec. The other Provinces, too, are moving towards greater support of the capital cost. Municipal support is being increased, although here there may be a limit, especially in larger centres, because, unlike with Provincial and federal taxation, the brunt of municipal taxation falls upon the property owner. Two years ago the federal government following representations by the Canadian Hospital Council, promised low-interest loans for hospital construction contingent upon a satisfactory adjustment of the taxing structure with the Provinces; this has not materialized to date. In the United States the federal government has voted huge sums over a period of years to assist in hospital construction.

This trend is of interest to the doctor who is desirous of adequate facilities for his patients. With more governmental contributions and with greater per capita per diem operational payments to help care for indigents, it is but natural to expect that the government will insist upon a greater voice in the utilization of these public funds. That is only right, for large sums could be used up in misdirected or duplicated endeavour.

Projecting this development, will the government ultimately take over the hospitals as is now being done in Great Britain? One doubts this very much. Our Provincial grant and municipal payment system, plus the placing of private patients in public general hospitals instead of in private nursing homes, has made it easier for our boards of voluntary hospitals to carry on despite a general lack of endowment that has been the case in England. Of still greater importance, approximately 80% of our public hospital beds are operated by voluntary groups and nearly half of these are under the direction of Roman Catholic Sisters, an avenue of service which, naturally, they would not give up except under the greatest pressure. One cannot conceive of any government in this country being so rash as to attempt to emulate Henry the Eighth.

THE ULTIMATE PICTURE

Ultimately we may anticipate a picture somewhat like this: our voluntary system of hospitals will be retained but with an increasing percentage of municipally owned hospitals. Not only in rural areas but also in large cities. Except in small centres, nearly all new hospitals of the future (*i.e.*, those under new management, not extensions to existing hospitals) will probably be initiated and built either by the municipality or by church groups, particularly the Sisters' Orders and to a lesser extent the Salvation Army and other bodies. In smaller centres it is still fairly easy for a group of enthusiastic and altruistic citizens to organize and partially finance a new community hospital, but in larger centres the difficulties have become so great that, as a matter of record, practically no undenominational voluntary general hospital has been set up in a larger community for many years. A large proportion, probably the major portion, of the cost of construction will come from public funds — municipal, Provincial and possibly federal. Practically all of our patients will have their hospital expenses — and probably their major medical expenses too—borne by some common fund; ultimately this arrangement may become part of a state-sponsored compulsory plan. One would hope, in the interests of efficient and economical operation through a greater realization of personal responsibility, that it would always be on a contributory basis.

At the same time the voluntary hospitals may well be obliged to co-ordinate their services much more closely than at present. Central co-ordinating boards, somewhat as in Great Britain, may be found expedient. There may be fewer hospitals. Duplication will be reduced and closer links established between rural and urban hospitals. This last development, urged by most objective students of this subject, is closely dependent, of course, upon the type of medical practice developed, particularly the basis of medical payment and the place of the specialist. Some rural hospitals may be replaced by small emergency and obstetrical "nursing stations", probably functioning also as a community "health centre".

These anticipated hospital developments of the future cannot but have a profound influence on medical economics. Some of these changes we can see very clearly; others are hedged with varying conditional factors. Medical practice has undergone more basic changes since World War I than most of us have realized, largely because these developments have been so gradual. There is much evidence that the hospital is to play an increasing rôle in the work of the doctor, be he practitioner or laboratory worker. Many of these changes must be regarded as inevitable, for they have become fundamental to the welfare of the people. While the economic effect on the individual has varied, to the vast majority of the profession the general result has been distinctly advantageous and, if the profession continues to give intelligent and unselfish co-operation in further developments, should continue to be so.

MEN and BOOKS

THE DOCTOR'S OWN WAITING ROOM

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The more there are in the doctor's waiting room, the less there is to wait for. Socialized medicine inundates that chamber.

The medical panel means patients, but good treatment is only obtained by time and effort. It takes time for the physician to accomplish. It takes effort for the patient to make an appointment—to be on time—to demand careful examination—to confer with others—to follow instructions.

In five years nearly all of this continent have sat in a doctor's waiting room. There are other continents with similar colics, coughs and agonizing fears where no one can sit. Doctors there are rare.

It is a strange place, that waiting room. Some faces are pale. Some lips are blue or painted red. Cheeks ruddy with the wind. Perhaps a pimple on the nose spelled doom—before penicillin. Cellulitis of the nose or cheek is still dangerous and should rarely be incised.

Sometimes translucent drops moisten a forehead. The drops may be green, or yellow, or blue in the chromidositics. Heads may be bowed like the sleepy uræmic, the tired, the old and despondent, or the young girl ashamed.

Thorek pictures 636 diseases diagnosable with one peek at the waiting room before the doctor slips out to golf. Much of the fear and fun of human existence is revealed in the face.

It is a morbid spot, that room. Few talk, no one sings, rarely does anyone laugh. The big ones, like the adiposi genitalis sit on two chairs. The achondroplastics with short legs sit on the floor.

The waiting room is cosmopolitan. A perky harlot, (and I liked her) once ran out of my waiting room to get a polio girl an ice cream cone — and she ran out again because the lass wanted a brown one instead of a white one. There have been at least 10,152 polios in Canada in the last ten years.

And the bald minister who looked as though every soul he'd failed to save had plucked a whisker from his chin. He used to sit near the electric fan and shake his head. A Canada Year Book mentioned 14,400 male clergymen. A health expert estimates 14,000 to 15,000 harlots in Canada.

One writer says the waiting room door is important. A black colour depresses. White gets dirty. Red is bloody. Green is quiet and pastoral. John Hunter just used his name. The same writer referred to a doctor who used his name plate on his coffin to save money. The door should be partly open—except in thieving cities. Many a patient hesitates to turn the knob. The decision within has often to do with the slim cord with life at one end.

THE SIGN

The sign is rarely indicative of the doctor. It may be black in gold, or painted on the window, or daubed on the wall. Some sway with the wind or droop. Often the gold turns dark. Letters become loose and fall away.

Just off Fifth Avenue a famous doctor's sign is small. So small it is lost to the street—and the doctor is so big.

Many a doctor has no sign. The doctor of preventive medicine, who may save millions of lives whereas clinicians only save a few, has no sign.

In many Canadian villages the doctor has no sign. No passer-by knows where. He isn't supposed to know. The physician belongs to the community. His door merges with the landscape as familiarly to folk as the high hedge sheltering the road. The road winding down across the lazy Maitland.

THE DEGREE

Some have the prefix *Dr.* Some append the degree. But the term *doctor* is given by many faculties. The philosopher got it in Germany for studying about *why*. A friend philosopher with a face like Nietsche, told me "There are so many things I do not understand—man's relationship to society, his relationship to God, his relationship to himself". I suggested that the last might be rather close. He said his relationship to his wife was never clear until she left him. They gave him a doctor's degree. Then all was clear.

Divinity gives degrees for healing souls. Veterinaries get degrees for healing sows. Few professions have advanced like the veterinary. Diseases like Brucella abortus, bovine tuberculosis, psittacosis and a host of others belong both to veterinaries and medical men. Veterinaries today must be doctors of prevention of human animal-born diseases.

A graduating degree is only a harness. An honorary degree is given after the race.

Some day a governor, with skin like finely cracked old marble, will rustle in his orange flowing robes and mutter, "Who is that?" "I don't know". "What are we giving that bird a degree for?" "Don't ask me—a funny old geezer—they say he loved everybody".

IN AND OUT

When patients are coming near the waiting room their steps get slower, their expressions glummer. Coming out they hurry so. My secretary recorded many remarks when patients went out. A Lancashire old lady in whom I had left a stone in the common duct muttered, "He is a lamb". A dentist said, "Tut, tut, he is like all the rest, a pat, pat and a few platitudes". And one typical Canadian with whom I had a

difference about a bill, whispered audibly, "The old bastard".

GONE YESTERDAYS

Once, someone near the inner door heard the doctor say "You must forget the past". "But I worry about it doctor, if I had invested right I'd be on Easy Street". The writer has looked around half the world for Easy Street—there might be one somewhere, perhaps someone lives on it. Socialists say, "It is just around the corner".

"You see", the doctor had said, "the past is gone; tomorrow beckons". "I'll do that, doc", the patient agreed and he stuck out his chin. But the picture of a church on the waiting room wall reminded him of the cemetery behind the sand hill 40 years ago and the little girl in the buggy. "Oh dear, no! I must not remember that", and he grabbed the door. But the touch of the door knob pained him. The fingers that couldn't reach like the concert pianist's—the stump with the dashed hopes—and he moved down the hall. He opened the door and saw a red carpet with a canopy across the street. He tumbled back thirty years. He heard the spattering of rice. He saw a tilted chin. He felt her lips. Then she was gone like roses in November wind.

And the psychiatrist had tried to tell him feeling was just psychosomatic. He was so hungry. His mother and grandmother had been so hungry. Diabetes too belonged to the past. He looked up and saw a blue sky like Amiens. When his blood sugar was high he always confused the two wars. He rubbed his eyes and wondered and even hoped for the boy—wherever the plane came down.

He mutters to himself, "I cannot forget the past". Down the street he goes clutching to torn yesterdays. Pathology *is* the past.

THE SAD ONES

A boiler mender always sat near the outer door. For eleven years he'd been very sad—we had given him bromides so he wouldn't notice life's vicissitudes—and benzedrine to brighten the morning and strychnine to waken his afternoons—and B_1 to nourish the neurons—he was still so sad. We tried thyroid to keep him young and mixed glands to keep him from getting old. The psychiatrist told us the patient enjoyed being sad.

But sadness should not be a prerogative of the waiting room today. Preventive medicine is cheerful. It points to happiness. A full life without the ravages of preventable diseases. All diseases are preventable—only man's ignorance is the bar.

It was quite different fifty years ago. Then the untrained doctor and motherly nurse trapesed up the drudging hills of life, bearing vinegar to dying lips. And a hospital. Well, it was before the morgue.

How the litterateurs of the late Victorian era revelled in that gloom. They froze the daughter on the Hesperus with brine. They swamped Mary with wild waves calling home the cows. She never heard them moo. Of course Lucy Gray never got back from the bushes.

They scorched the boy on the burning deck and buried Sir John Moore and Moses in the same vein but with a different metre. A party were well drowned when waves flowed over the Inchcape Rock. And they hung Danny Deever in the morning.

How Mary's little lamb ever got through the lean litterateurs of those days without becoming a chop is a historical mystery.

The gloom got the painters too. Landseer painted stormy skies. Every cloud was dark. Every old man was stooped. His underwear was wrinkled and his pants hung down.

The waiting room should be cheerful. Science knows no gloom. It may grope, but flashes of colourful light burst forth. They came with the sulfas, radar, penicillin, chain reaction—they shall bring happiness.

IT'S COSMOPOLITAN

Everyone waits in the waiting room. Once I peeked out and there was a chief of police, a questionable girl and the pretty seamstress who kept the hat shop. It flashed upon me what Montesquieu said. "Our virtues should be touched with a—certain nobility, our morals with a certain freedom, and our manners with a certain politeness". I looked so long that when the door closed I heard the chief say "I think the doctor is tight".

Once a little minister lowered his glasses and saw the blue hat—and her eyes were blue to—"I wonder what she has? Just a cold, of course— How she'd sit at the head of the brown manse table and pour". He hoped she'd let him have sugar and his own old moustache cup. He saw her ankle and sighed. He must put sin aside. And the fat old lady with the grey suit and the hæmorrhoids, shifted over on the other hip. She saw the cigarettes. "The little hussy", she muttered, "I hope she never meets my boy". She turned her nose to see the calendar of last year and the wrong month. And the young drummer saw her wriggling her toes. He eyed the calf and the dimple beneath her knee, as delicate as a fawn. He thought of his creaky bed with the cold sheets in the hotel and he thought—he just thought—for the door opened and the doctor said "Next".

HOW THEY SIT

They sit so strangely. The stout lady with her feet apart and slightly stooped. She is pulled forward by her abdomen. Its pendulosity serves no purpose. Many women have asked me to remove it.

The little girl from the ladies' college sits with her knees close together. A stiff knee is

always in the way and the gouty look mad. Many gouts have no pain in their feet. In tetany the feet are stuck out with the toes pushing into the floor and turned in.

Bromidrosis may be diagnosed in the waiting room for such feet smell. With a protruding disc the patient may have his hands by the side of the chair to transfer weight to the upper part of his trunk. With an ischio-rectal abscess the patient will sit only half on the chair—or not at all. If he sits way forward with his head on his knees and grasps his foot he may have Burger's disease or be asleep. With fracture of the lesser trochanter he can sit but cannot raise his knee.

Of course many never sit at all. The impostor rushes in before the others. It is a rushing world. He pushes in the line at the theatre and the rugby game. He pushes through life—always pushing humanity out of place.

And the bailiff never sits down. Nor the doctor's daughter. Nor his wife. Nor the patient with pruritus.

Usually they are so silent. Sometimes the great adviser speaks. He knows all about everything. How the doctor should treat the liver. And how the lawyer should win his case and what the mother should feed her baby. Whether the nipples should be normal or synthetic. But he never holds the baby. Free advice is usually worth its fee. There are so many ways of apologizing for failure. And the cheerful old lady who said she had been pregnant for twelve years. Life indeed " 'as been ups and downs'' but "mostly ups".

THE PEEKERS IN

And some never get quite through the door. They loiter just outside and perk their heads around the corner. They come to the door and pause. A negro waited outside my waiting room door till all were gone. A Salvation Army man waited because the room was full. An 18 year old girl hung around. She didn't want her boy friend see her go in. Many get tired and go away.

Life has its peekers in. They peek into church in time of trouble. A now distinguished publisher told me he went to church after the fall of France to see if there was anything in it.

The peeker-in noses into the court room wishing he were a lawyer. He'd like to plead over a bar instead of slobbering over one. Everyone wants to be something else. The internist would like to have studied eyes. The general practitioner yearns for a specialty. The specialist sees fame in research. The researcher sees himself an economist. The economist a farmer. The farmer a minister. The only satisfied are the Porgies with "*plenty of nuttin'* ".

Some peek into nurseries with hope. Many into homes for aged with fear. Poverty peeks into store windows with pearls and diamonds, the new and gorgeous. Wealth peeks into dusty windows of second-hand shops—for the old, the apparently insignificant, the cheap. Antiques are objects of art, old, lovely, lonely and priceless.

Some peek into the stars and become frightened. Two or three scientists quit investigating atomic energy. Often the peeker strolls down the hall and never comes back.

WHAT THEY READ

What they read in the waiting room is fascinating. "I hope I can finish this'' one lady muttered and another said "The best reading I ever did was started in the waiting room and finished at home''. Folks like to read what they agree with. They agree with what the home, the school, the university and the newspaper has told them.

A famous psychologist told me that 5% of the world are manic depressives. And so the sour faced read about depressions, maladministrations, the wealth of the miserly rich, the poverty of the hungry poor, the amputees who hocked their metal legs, the hundreds with no coats, no shirts, no pants. The thousands of girls who ran astray and the millions of men who ran after them.

They see the awful Jew, the despicable negro, the cruel German. They revel in the illiterate cauldron of hate and how they enjoy it. But they never see Einstein with the kind face and scintillating mind. Nor Roland Hayes who sang before kings and whose mother prayed that he would always be humble and it took a dozen men to ambush his grandfather who was an African chief.

Nor do they think who wrote "Silent Night'' when so poor and so hungry it was the only Christmas present he could give his children—and it was in German.

Once a patient thumbed through a musty magazine. His fingers paused. There near the altar in the still church the father stood. Drops of rain struck the panes. They rattled like angry hail. He stood on one foot. The other was on the church seat. His fingers idly fondled the trigger of a gun. The bride in taffeta looked down. The minister prayed in a hurry. Down the aisle shuffled a youth. He paused and looked at the door. The boy paled. Her father raised the gun—and then the doctor opened the door.

For 27 years the patient has wondered. Did the father shoot? Did he reach the door? Were they happy after?

The office is gone. The doctor is somewhere. The patient doesn't remember the magazine and his friends say "So nice but he looks as though he'd missed something''.

To enjoy a magazine in the waiting room read the last paragraph first. Or steal the magazine; 20% of the doctor's magazines are stolen.

Reading in the waiting room beautifully exemplifies adult reading today. Pseudo facts, ill got together, with little foundation and pleas-

antly arranged, flow through the brain like bile through the common duct. Reading is held up in the modern by stupidity, rarely by meditation. Just as an obstructive stone causes pain, so something the reader doesn't understand is pain when he has to think. Literacy doesn't mean education nor does modern reading mean the *exercise of reflective thought.*

Bishop Renison told me he liked to read Gray's "Elegy" alone, quiet, where he could pause, reflect and love, and no one see the tears.

PICTURES

Unusual pictures hang in the outer room. The tense physician giving diphtheria antitoxin to the girl in Scotland—and the queen who had sent for him—held sway for fifty years.

He must have gotten awfully tired—sitting there. I have seen him sitting in Toronto in waiting rooms — sitting in London — in New York. He was hanging pretty well to one side in a western Ontario town. The top of the picture was so far from the wall in Saskatchewan that I was afraid he'd fall out. Snow blew on his beard in Manitoba.

Most of these pictures are disappearing. People also forget that the discovery of diphtheria antitoxin marked the turn of medical discovery. It is now in geometric progression. Perhaps every fact in life can some day be revealed to the human mind.

A taxi driver with gonorrhœa once stopped as he was running out of my waiting room. He looked at an eighty year old print of Napoleon giving the jilt to Josephine. I said "Do you like Napoleon?" "Oh, is that who it is? I was looking at the table". He saw a French table with Italian marble and most certainly Greek legs, but still French in poise and design. He muttered "My people bought Victorian furniture over eastern states for fifty years". He rushed out to do a little boot-legging.

In a specialist's waiting room the pictures are softer—sometimes done in oils. His voice is quiet. He speaks more gently. Looks more severely. Charges more. His children go to private schools but he dies about the same time.

A cough in the waiting room doesn't mean a common cold, but usually means an impatient patient. Only 28.7% of tuberculous patients mention a cough.

WHICH FLOOR?

Doctor's offices are not usually on the bottom floor. One waiting room lay sort of tired at the foot of a winding stair. It was in the basement. A traveller who came summer after summer got to watching the feet come down. Some were flat and pointed out. The soles were worn. Sometimes a foot was sideways on the step and he knew someone was old. When two feet curled in and out on the bannister it wasn't a patient and they'd slide down. Once it was a moccasin and many of them have tuberculosis.

A clatter and a squeak occasionally came down. Over two million people on this continent have missing limbs. A few thousand make artificial limbs. The drummer told me that coming down the stairs the slow crunch of the metal leg and the quick tap of the good one seemed to scan in metric feet.

Man's in/..human/..ity/..to man
Makes count/..less thous/..ands mourn.

For all amputations are due to man's inhumanity. The careless driver. The road hog. The totalitarian state. The hunger for power. Prosthesis, however humane, arose from inhumanity.

And once two pair of feet went up. Just at the bend where he couldn't quite see and no one could peek from above the little shoes turned towards the heavy brogues and she stepped on his toes. He thought he heard something—but then the traveller was old, but not too old, for he smiled. Or was it a tear? They are so close. One could imagine it was Nelson and Lady Hamilton, or Rossini's Rosina and her Lindor, or Burns with Mary—for something was on the turn of the stair that goes higher than Ariadne and deeper than the sombre sea.

EVENING CAME

One day the sign read "The Doctor Is In" but it was quiet. A puffy girl with asthma waited and then wheezed out. The old man with knock knees stroked his beard and waddled away. The sunlight between his legs threw a triangle on the mat. The myxœdematous old lady glanced at the sign and oozed down on a chair. Her puffy jowls hung low. Her chin lay between her bosoms which rose like Atlantic swells with each snore. Her puffy skin was loose. How sweet the intoxication of sleep, that fades the yesterdays, fears not tomorrow, the messenger of peace. She cared not whether the doctor was in or out. It was all so gently quiet, like Liszt's "Liebestraum". But the neurotic school teacher couldn't wait. She listened and turned the knob.

His head lay forward. The June breeze toyed with his grey locks. His lips were blue. The fine skin was white and cold. The stethoscope was pressed close to the desk. Near his fingers his watch lay, back open. Her picture filled the case. Perhaps she'd tilted her chin and threw back her hair, as golden as the frame. Maybe she stepped right out and down the carpet like forty years ago. It looked as though he'd lifted the watch—so heavy; and then he'd touched her cheeks and kissed her cool, cool lips.

Rx was on his pad. He must have rubbed it out for he'd written in large English "TAKE". For four decades he'd told them to take pills—small tablets like kernels of mustard seed—large capsules, big as plover's eggs, red

pills, yellow pills, white powders; before meals—after the soup—with water or weak tea—or strong whiskey. And some took the fluid to wash it down and forgot the pills. And they had taken the wrong ones; the postman who took his wife's ergot and felt strange pains like he never felt before and the seamstress who took two teaspoons of the scalp rub every two hours. She was so much better. It takes years for scientific investigation to produce a specific. But most medicines are placebos—even the touch of the nurse's fingers is placebo and should be repeated if necessary. Mostly he'd wanted them to take advice which they did for a few days.

Yes, he'd written "Take"—and down below some faint indecipherable lines—then a brave word—ME.

Out in the waiting room the metre ticked. The same June breeze billowed in the long lace curtains. It rocked the chair back and forth. A bee hummed low. The sun crept down until the shadow of the green vase reached across the room.

Then someone gently changed the sign. It said so surely

"THE DOCTOR IS OUT"

ASSOCIATION NOTES

SEVENTY-EIGHTH ANNUAL MEETING
of the
Canadian Medical Association
TO BE HELD IN THE ROYAL ALEXANDRA HOTEL, WINNIPEG
JUNE 23, 24, 25, 26, 27, 1947

Program

The complete program will appear in the June issue of the *Journal*.

OTHER MEETINGS

The Manitoba Division

The Manitoba Division will hold its annual business meeting on Tuesday afternoon, June 24.

Canadian Cancer Society

The Grand Council of the Canadian Cancer Society will meet in the Royal Alexandra Hotel, Winnipeg, on Saturday, Sunday and Monday, June 21, 22 and 23, commencing at 9.30 a.m.

Royal College of Physicians and Surgeons of Canada

The Royal College of Physicians and Surgeons of Canada will hold the following meetings in the Royal Alexandra Hotel, Winnipeg:

Monday, June 23

11.00 a.m.—Meeting of the Executive Committee.

Tuesday, June 24

9.00 a.m.—Meeting of Council, continuing all day and during the evening.

The Canadian Society of Allergists

Tuesday, June 24

9.00 a.m.—Round Table Discussion—Asthma in Adults and Children.

Dr. H. K. Detweiler (President), Toronto.
Dr. A. T. Henderson, Montreal.
Dr. C. H. A. Walton, Winnipeg.
Dr. J. R. Ross, Toronto.

11.00 a.m.—Business Meeting.

2.00 p.m.—Scientific Session:

Bacterial Allergy.
Dr. K. A. Baird, Saint John.

Histamine.
Dr. Bram Rose, Montreal

Antihistamine Drugs.
Dr. A. T. Henderson, Montreal.

Bronchoscopy and Bronchial Asthma.
Dr. S. McEwen, Winnipeg.

The Use of Slowly Absorbed Pollen Extracts in the Treatment of Hay Fever in Children.
Dr. J. R. Ross, Toronto.

Periarteritis Nodosum.
Dr. I. H. Erb, Toronto.

The Canadian Anæsthetists' Society

The fifth Annual Meeting of the Canadian Anæsthetists' Society will be held on Wednesday, June 25, immediately after the session of the Section of Anæsthesia under whose auspices all scientific meetings are being held. The agenda will include the election of officers and a discussion of tariff, certification, postgraduate education and any new business presented by members. Following this, the annual reunion and dinner will be held from 5.30 to 8.30 o'clock. On Thursday, June 26, business meetings of the various Provincial Divisions will convene at 4.30 p.m.

Canadian Heart Association

An organization meeting of a Canadian Heart Association will be held on Tuesday afternoon, June 24, commencing at two o'clock. All cardiologists are urged to be present.

The Alberta University Medical Alumni

The Alberta University Medical Alumni will hold a dinner at the Fort Garry Hotel, Winnipeg on Thursday, June 26, commencing at 6.30 p.m. All interested are invited.

The Canadian Medical Protective Association

The Canadian Medical Protective Association will meet at 4.30 p.m. on Wednesday, June 25.

The Canadian Association of Radiologists

The Canadian Association of Radiologists will meet in the Royal Alexandra Hotel on the afternoon and evening of Tuesday, June 24.

The Federation of Medical Women of Canada

The Council of the Federation of Medical Women of Canada will meet on Tuesday evening, June 24. The Annual Meeting will take the form of a breakfast at 8.30 a.m. on Wednesday, June 25, at the Business and Professional Women's Club, 3 Evergreen Place. Following the breakfast there will be a business session.

The Canadian Urological Association

The Canadian Urological Association will meet on Thursday, June 26 at the conclusion of the afternoon session of the Section of Urology.

Registrars of the Colleges of Physicians and Surgeons

The Registrars of the Colleges of Physicians and Surgeons of Canada will meet at 2.00 p.m. on Thursday, June 26.

The Canadian Orthopædic Association

L'Association Canadienne D'Orthopédie

The third annual meeting of the Canadian Orthopædic Association will be held in the Royal Alexandra Hotel, Winnipeg, on Monday and Tuesday, June 23 and 24.

Monday, June 23

9.00 a.m.—Traumatic Lesions of the Posterior Tarsus.
Dr. W. B. MacKinnon, Winnipeg.

Fusion of the Ankle Joint.
Dr. J. A. Leo Walker, Montreal.

Recurrent Subluxation of the Ankle.
Dr. Geo. F. Pennal, Toronto.

Spondylolisthesis.
Dr. R. I. Harris, Toronto.

Giant Cell Tumour of the Sacrum.
Dr. L. P. Roy, Quebec.

12.00 noon—Business Meeting—members only.

2.00 p.m.—High Osteotomy in Femoral Neck Non-union.
Dr. R. G. Townsend, Calgary.

Observation on Methods of Pinning Hips.
Dr. Beattie Martin, Regina.

Reduction and Fixation of Femoral Neck Fractures Under Fluoroscopic Control.
Dr. G. H. Ryan, Winnipeg.

Tuesday, June 24

9.00 a.m.—Fusion of the Wrist Joint.
Dr. A. A. Butler, Montreal.

A Case of Spondylitis of Proved Etiology Treated by Streptomycin.
Dr. Roger Gariepy, Montreal.

Repair of Shoulder Capsule Lesion.
Dr. D. E. Starr, Vancouver.

Late Results in Knee Arthroplasty.
Dr. J. E. Samson, Montreal.

Bilateral Congenital Pseudoarthrosis of Clavicles.
Dr. J. C. Rossignol, Ottawa.

2.00 p.m.—Early and Late Treatment of Slipped Femoral Epiphysis.
Dr. Antonio Samson, Montreal,
Dr. Leo Jarry, Montreal.

Stabilization of the Paralytic Foot.
Dr. Ulric Frenette, Montreal.

Scapular Transplant in Abductor Paralysis of the Shoulder.
Dr. J. E. Bateman, Toronto.

Patellectomy.
Dr. H. M. Coleman, Toronto.

Welcome to Winnipeg

"Tell me
What sort of citizens inhabit here
And how are they affected?"

Those of you who have not visited us before will doubtless be curious to know something about Winnipeg. I could give you many facts and figures about gold and grain, about furs and farms, about metals and money, about homes and buildings and factories. But concerning these matters there is an abundance of illustrated literature which is free for the asking and for which you are urged to ask. Here I do not mean to dwell upon the physical aspects of our city but rather upon the people who give it life.

Every city has its own individuality and the larger cities of Canada are particularly distinctive, so various and different have been the circumstances that gave them birth and fostered their growth. Almost since its foundation Winnipeg has been known as the Gateway of the West. For decades people of every country on every continent turned their eyes to the West and made Winnipeg their destination. Many went further on but many stayed. And so it is today that, if you were to stand at the busiest corner at the busiest hour, there would in a short time pass before you men and women whose mother tongues include every language that is written; people of every race, of every colour, of every calling, of every creed. And you would see, also, stalwart youths and handsome maidens in whose veins runs that admixture of bloods from which alone can come a distinct Canadian People. There before you are the old and the new, the raw materials and the finishing product, and all about you is the city they have made and are making.

Because the citizens of Winnipeg are of such various origins, of such diverse cultures, of such different traditions, our population is perhaps the most heterogeneous of any Canadian city. Yet by very reason of these differences there is among us a unanimity of thought and a spirit of tolerance that is as emblematic, as prophetic and as noteworthy as is the unguarded frontier sixty miles to our south. Ethnically Winnipeg might well be the home of U.N.O. for here we are an accomplished Unity of Nations living in harmony.

In 1873, when Winnipeg was incorporated, its population was only 215 people. That was only seventy-four years ago, and many if not most of its citizens, came here as strangers to build their fortunes. In worldly goods and in purpose they were equal and it was worth that won. So long as the coin rang true the stamp it bore was of no moment. It mattered little what language came easiest, what ritual was followed, or what the past had been. Among these many men of many manners there was the free intimacy of co-workers, and those who might under other circumstances have been critical, found their criticisms tempered and their prejudices weakened by association with worthy fellow labourers.

When differences are few and agreements are many, people become friends, and being friends, they look with tolerance upon the matters whereon they disagree. When things have to be done and a city has to be built there is no time for wrangling about isms and ideologies. And so these people of many races and of every belief worked in tolerant companionship, bending themselves to the task of helping each other to prosper, for prosperity is not a thing that one can bring about by himself. The people who throng the streets of Winnipeg are those pioneers and their children. They still take pride in the tradition they have inherited from the land in which, by chance, they or their fathers were born, but they take a greater pride in the land of which, by choice, they are citizens, and in the city which their own hands have built.

Everything that a man makes is an expression of himself and so Winnipeg is the setting forth in stone and brick of its builders' personalities. The streets are wide—the main thoroughfares are 100 feet from side to side—and straight, some running for miles with scarcely a bend. Surely the men who planned these streets gave concrete expression to the breadth of view and straightforwardness of purpose that characterized the citizens. Nowhere will you find dark alleys or crooked lanes to engulf and bewilder the stranger but everywhere wide straight avenues by means of which one can quickly and directly reach his destination.

Years ago the Indians camped by the junction of the two rivers. Later the Hudson's Bay Company built a fort of which there now remains nothing but the gate pictured above. Later still there grew about the fort the hamlet of Fort Garry, but such were the faith and vision of its 215 inhabitants that when application was made for incorporation it was the charter of a city that was sought. In those days the site was a bald and treeless spot upon the prairie yet, today, the visitor would swear that Winnipeg had been built in a forest, for on nearly all its streets wide boulevards separate sidewalk from roadway with great elms and other shade trees whose interlacing branches form a leafy arcade pleasing to the eye and comforting to the body in the heat of summer.

In the newer suburbs where the trees have not yet grown, street after street stretches for block after block with pretty houses set in broad lawns and with neighbour separated from neighbour by nothing more formidable than a border of flowers. Therein lies another symbol—the symbol of friendliness.

Today Greater Winnipeg covers many square miles. Within it is included old municipalities such as the Kildonans, the home of the Selkirk Settlers, and new ones which are of only a few years' growth. Across the river is the City

Old Fort Gate, Winnipeg, Manitoba

of St. Boniface founded about the same time as Winnipeg by French speaking settlers. The "bells of the Roman Mission" still ring out but their once far-reaching voices are now drowned or muted by the noise of a modern metropolis. But the city noises scarcely reach the two great parks upon the outskirts. Each of these is many acres in extent and both are beautifully treed. It is difficult for a stranger to realize that these woody places were, a generation ago, naked prairie, that every shrub and bush and tree was deliberately planted where it now flourishes. These well planned and beautiful playgrounds are the Mecca of the citizens during the warm months. There they rest and play and picnic and, on occasion, gather by the thousand to listen to special music and to sing. There is in that singing something infinitely inspiring. Then will you see old and young representing in their original nationalities every land and clime, blending their voices into one sound, undoing in their common speech the curse of Babel, proving in themselves that heterogeneous can become homogeneous—that there can be One World. Young though it is—perhaps because it is young—there is in Winnipeg much symbolism, much prophecy. It is a pleasant place in which to live and so will you find it if you visit us, as we hope you will.

"The town, my lord, is rich and populous,
And in it do the citizens take pride;
As well they might, for they have nature graces
Richer than all their wealth, and chief of these
Is kindly hospitality."

J.C.H.

Women's Golf

A Golf Committee has been organized in connection with the Women's Section of the C.M.A. meeting. Friendly games will be arranged for wives of doctors attending the convention and for any women doctors. Should there be sufficient interest, a tournament will take place on Friday morning, June 27th.

To be proud of learning is the greatest ignorance.

It is a little learning, and very little, which makes men conclude hastily.

No man can be provident of his time who is not prudent in the choice of his company.—Jeremy Taylor.

MEDICAL SOCIETIES

London Academy of Medicine

The London Academy of Medicine held its stated meeting on March 27. Dr. N. F. Miller of Ann Arbor, Michigan addressed the Fellows on "The Abuse of Pelvic Surgery' and Dr. H. A. Towsley, also of Ann Arbor, spoke on "Convulsions and Their Management in Infancy and Childhood".

The Osler Society of McGill University

The Osler Society of McGill University held its 25th annual banquet on March 28. The occasion which is one of the notable events of the University calendar was further marked as being the 75th anniversary of the date of Osler's graduation, even to the very day.

The traditional ceremonies which have become associated with this undergraduate Society were all fully observed. Dr. W. W. Francis, Osler's nephew and librarian of the Osler Library, exhibited some of Osler's first examination papers, also the introduction to his graduation thesis on pathology, which earned him a special prize. The thesis itself has been lost, but the introduction, couched in flowery language, was rescued, probably because it had not been submitted.

The President, Mr. Sean Murphy, then duly displayed and commented on three pieces of Osler's silverware which have become the property of the Medical Faculty: a water jug, a cigar box, and a large three-handled loving cup. The water jug was a gift to Osler from his colleagues in the Montreal Veterinary College formerly affiliated with McGill, when he left Montreal in 1884. It was in constant use for ice water in Baltimore, but the demands on it were not heavy in Oxford.

The cigar box was a gift from No. 3 Canadian General Hospital in France, after his visit to them in 1915. It bears the name of all the officers of the unit, amongst them being his son Revere, who began his service with the hospital before transferring to the Artillery.

The loving cup, an extremely handsome piece of silver work, was a gift to Osler by the staff of the Troy Hospital, N.Y. in 1900, on their 50th anniversary, at which Osler gave his address on "The Influence of a Hospital upon the Medical Profession of a Community".

Even the chairman's gavel had an Oslerian association; it was made from a piece of oak salvaged from the burning of the Bond Head Rectory where Osler was born. The wood was a gift from Dr. Norman Gwyn of Toronto.

After these introductory comments the ceremony was carried out throughout the entire assembly of drinking to Osler's memory from the loving cup, which was passed from one to the other. The custom is that during the honouring of the toast three people should be standing, the one who is drinking from the cup, and one on each side of him, these two turning towards the man in the middle. As Mr. Murphy explained, the origin of this ancient method of toasting, while a little obscure, lay probably in the necessity of having sometimes to support the toaster, or possibly even was designed to protect him from attack whilst in a vulnerable position with his head deep in the cup.

When this ceremony was completed Dr. Wilder Penfield introduced the speaker of the evening, Dr. Wilburt C. Davison, Dean of Medicine in Duke University. He sketched the brilliant career of Dr. Davison with whom he had many memories in common as they had been at Oxford together and share equally in paying homage to Osler.

Dr. Davison's address was built on his reminiscences of Sir William. It is not given to many men to be able so happily to recapture a unique personality as Dr. Davison did for his audience. An attractive voice, a quick, easy, and humorous style of talking, and a deeply responsive affection to Osler's extraordinary influence on him as a student produced a truly delightful effect. The character and personality of Sir William have been made so familiar even to those who never saw him, that it may seem difficult to say anything fresh or striking about him. But Dr. Davison was able to pass on to his hearers much of the unforgettable vitality which Osler radiated; his quenchless, glowing interest in younger men; his quality of so concentrating himself that each one of the countless numbers who met and knew him always felt that he himself had been specially singled out for attention; his capacity to stir the desire for knowledge; his charitableness in thought and word. How difficult it was for most people to imitate this last characteristic, Dr. Davison remarked; in Osler it was a natural quality and one in the exercise of which he never needed to remind himself. He could be stern when he wanted to be, but his reproofs were always rightly earned. Dr. Davison's own introduction to him came about when as a Rhodes Scholar he had been sent to Sir William for advice on the details of his medical course, and was brought in to Lady Osler as another "raw American colt". Later, with possibly some humorous exaggeration of his own shortcomings, Dr. Davison assured his audience that in many of his oral examinations his questioner would so forget the subject in hand to talk about Osler, that he had no difficulty in passing. He had once gone to see Sir Arbuthnot Lane do his bone-plating operation, and heard him vigorously attack the Albee bone graft method and incidentally Americans in general. In the course of his criticism of the Albee bone splint he handed Dr. Davison one of the Lane steel plates with the request to note how strong it was. But rowing for six years had made an already powerful physique not the right type to choose for that kind of test especially when his country's surgical skill had been castigated. So, as Dr. Davison said, and in the best Sherlock Holmes manner, "I bent the darned thing double and handed it back to him"! However, later presentation of Sir William's introduction opened the door to Arbuthnot's hospitality.

One practical application by Dr. Davison of the Osler tradition in medical training was shown in his policy of choosing young men in the building up of Duke University Medical Faculty. In that he felt he had made no mistake. He had also made a point of establishing a good medical library again with the Osler tradition in mind.

St. Francis Valley Medical Society

In November last the St. Francis Valley Medical Society was formed at Sherbrooke, Quebec. The following officers were elected: *Honorary President*, Dr. R. H. Stevenson, Danville; *President*, Dr. W. E. Hume, Sherbrooke; *Vice-president*, Dr. E. A. Cooper, Asbestos; *Secretary-treasurer*, Dr. T. G. Moller, Lennoxville; *Representative to Quebec division of the C.M.A.*, Dr. A. C. Hill, Sherbrooke. The Society is a branch of the Quebec Division of the Canadian Medical Association. It has held meetings in Asbestos and Sherbrooke, and has had a very active season.

La société médicale des hôpitaux universitaires de Québec

Société médicale des hôpitaux universitaires de Québec vendredi le 21 février 1947.

STREPTOMYCINE ET MÉNINGITES À BACILLE DE PFEIFFER CHEZ DEUX NOURRISSONS.—M. Langlois, R. Thibaudeau et J. Demers.

Deux observations détaillées de méningite à bacille de Pfeiffer sont rapportées. Elles ont été traitées par la streptomycine seule et avec succès. Elles font pendant à un cas analogue présenté l'an dernier par les mêmes auteurs où la méningite avait été guérie par l'association de la sulfadiazine et de la pénicilline. Aucun accident toxique sérieux n'a été observé qui puisse être attribuable à ce nouvel agent thérapeutique.

LA STREPTOMYCINE DANS LES INFECTIONS URINAIRES.—J. N. LaVergne et A. Mercier.

La streptomycine dans la tuberculose urinaire et dans les autres formes d'infections urinaires a donné certains résultats qui semblent prometteurs. Les auteurs mentionnent certaines statistiques publiées par les observateurs de la Clinique Mayo, où il est fait mention de douze cas de tuberculose rénale inopérable, traités par la streptomycine. Six de ces patients ont répondu au traitement de façon satisfaisante. Chez deux patients, les urines inoculées au cobaye auraient démontré l'absence complète du bacille de Koch.

Ces mêmes auteurs citent un article de Keefer et de ses associés, rapportant 14 cas de T.B. rénale à peu près identiques à ceux étudiés à la Clinique Mayo. Chez huit de ces patients, la streptomycine a donné des résultats heureux. L'inoculation des urines au cobaye, pratiquée chez tous ces patients a démontré deux résultats négatifs, prouvant ainsi l'absence du bacille tuberculeux.

Au cours des infections urinaires, la streptomycine s'est avérée un médicament très efficace. Une observation illustre cet avancé. Il s'agit d'un patient souffrant d'un rhumatisme gonococcique depuis 1942, qui avait reçu sans succès du salicylate de N.I.V., un vaccin antigonococcique, des séances d'électro-thérapie, des sulfamidés et 3,000,000 d'unités de pénicilline. Le malade, à l'occasion d'une uréthro-cystite à pyocyanique a reçu une dose totale de 6,000,000 d'unités de streptomycine. Le malade quitte l'hôpital deux jours plus tard, définitivement guéri de ces deux affections.

RECTO-COLITE HÉMORRAGIQUE.—R. Lemieux et H. Nadeau.

Les auteurs rapportent l'observation d'un malade porteur d'une recto-colite hémorragique compliquée d'une infection profonde des parois coliques. L'examen radiologique et rectoscopique montre bien l'étendue des lésions qui semblent occuper pratiquement la totalité du colon.

Le malade est soumis au traitement par la pénicilline (200,000 unités par jour, pour une dose totale de 5,200,000 unités) et la sulfathalidine (3 grammes par jour, par doses réfractées de 0.50 toutes les 4 heures). Sous l'influence de ce traitement, les phénomènes infectieux s'amendent en un temps relativement court, l'état général du malade s'améliore rapidement. Il semble bien que ce traitement anti-infectieux n'ait agi que sur l'infection seule et que le syndrome vasculaire, hémorragique n'en ait été aucunement influencé; ce qui semblerait démontrer l'étiologie non infectieuse de la maladie qui serait bien plutôt une maladie diathésique, une maladie par sensibilisation. La recto-colite hémorragique évolue par poussées successives entrecoupées de rémissions qui simulent la guérison. Les poussées sont influencées par le traitement institué, mais celui-ci ne guérit pas la maladie elle-même. Le traitement curatif de la recto-colite hémorragique demeure encore inconnu. Il en sera ainsi aussi longtemps que l'on ne connaîtra pas mieux l'étiologie et la pathogénie de la maladie.

CONSIDÉRATIONS SUR LE TRAITEMENT DU LUPUS TUBERCULEUX PAR LA VITAMINE D^2.—Jean Grandbois.

Un patient présentant un lupus tuberculeux a été traité par une solution alcoolique de Vitamin D^2. Il a reçu une dose quotidienne de 240,000 unités durant le premier mois, et 120,000 unités dans la suite. Après quatre-vingt-trois jours de traitement, l'amélioration du lupus est très importante et même plus prononcée que chez d'autres patients traités exactement selon la méthode de Charpy. L'action de la Vitamine D^2, qui s'est aussi manifestée sur une arthrite tuberculeuse que présentait ce patient, semble être une nouvelle preuve du pouvoir bactéricide et bactériostatique de ce médicament.

Aucun signe clinique d'intolérance n'est apparu durant toute la période du traitement. Les modifications de l'azotémie ont été peu importantes. L'influence de la Vitamine D^2 sur le métabolisme du calcium s'est manifestée, durant les premières semaines, par une élévation progressive des chiffres de la calcémie et de la calciurie. Cependant au bout de deux mois, ces chiffres revenaient à la normale.

TORSION PRIMITIVE DE L'ÉPIPLOON.—Wilfrid Caron.

Un cas de torsion primitive de l'épiploon est étudié. Les symptômes subjectifs et objectifs sont ceux de l'appendicite aigue et le traitement consiste en la résection de l'épiploon. Il est important de connaître l'existence possible de cette lésion, si on trouve un appendice normal au cours d'une laparotomie pour appendicite aigue.

Société médicale des hôpitaux universitaires de Québec vendredi, le 7 mars 1947 à l'Hôpital des Anciens Combattants.

CONTRIBUTION DE LA PHARMACOLOGIE DES ACIDES AMINÉS IODÉS INJECTES PAR VOIE INTRAVEINEUSE.—P. de V. Fiset.

Les acides aminés iodés qui font l'objet de cette étude, résultent de l'association chimique de l'iode à des acides aminés d'hydrolyse enzymatique de la caséine. Cette substance dite "Formule 181" est une forme injectable d'Iodaminol fournie par les Laboratoires Desberger Ltée. Sa stabilité en solution tamponnée respectivement à ph.4.0, 5.0, 6.0, 7.0, 8.0, et 9.0 fut démontrée aux températures de 2° 20° et 37°C sans aucune libération d'iode.

L'étude sur l'innocuité des solutions injectées par voie intraveineuse pendant 30 jours, à la dose de 5 c.c. par jour chez un groupe de 30 lapins a donné les résultats suivants; Ces acides aminés iodés Formule 181 en solution de 5% n'ont pas influencé: (1) désavantageusement la croissance et le métabolisme énergétique, (2) la sédimentation globulaire, (3) la concentration de l'hémoglobine du sang, (4) le taux des globules rouges, (5) le taux des globules blancs, (6) la formule leucocytaire, (7) l'aspect microscopique et macroscopique du foie, de la rate, des reins, de la thyroide, (8) l'aspect macroscopique du cœur et des poumons.

DES GREFFES CUTANÉES DANS LE CAS D'OSTÉOMYÉLITE CHRONIQUE.—A. Jolicoeur.

Pendant la guerre, grâce à une chirurgie rigoureusement bien comprise et à ses adjuvants chimiothérapiques, on cherchait à fermer précocement les plaies par sutures secondaires ou par greffes cutanées. La peau reste pour une plaie le meilleur des pansements: elle arrête l'exsudation, active la circulation locale, ferme la porte à une nouvelle contamination. Quand une fracture composée s'est infectée et que l'ostéomyélite est devenue chronique avec cicatrice en cratère et fistule, il faut appliquer les mêmes principes chirurgicaux. L'orthopédiste et le chirurgien travailleront de concert en réalisant l'excision des tissus non vitaux (comprenant l'enlèvement des corps étrangers et des séquestres) et en les remplaçant par du tissu sain, par des greffes d'os spongieux, des greffes musculaires et cutanées.

A PROPOS DE TOUX.—Eustace Morin.

L'auteur présente une observation dans laquelle la toux était en rapport chez un vagotonique avec une rhino-pharyngite chronique. La connaissance élémentaire de la pathologie des voies aériennes supérieures a permis en l'absence de signes pulmonaires objectifs de reconnaître la cause de la toux et d'éviter que l'infection chronique qui en était la source aboutisse à une bronchite chronique.

UNE TUMEUR RÉTROPÉRITONÉALE.—Sylvio LeBlond et Roger Dunne.

Un jeune homme de 22 ans, porteur d'une tumeur péritonéale inopérable, a été traité par la radiothérapie et a survécu un an à l'exploration chirurgicale. La nécropsie a montré qu'il s'agissait d'un fibrosarcome à malignité restreinte. Les tumeurs rétropéritonéales ne sont pas aussi râres qu'on ne le croit tout d'abord. On

ne doit jamais les oublier dans le diagnostic différentiel d'une masse abdominale. Le traitement de choix, c'est l'excision chirurgicale suivie de la radiothérapie ou la radiothérapie seule si elle est inopérable. Les récidives sont la règle, qu'elles soient fibromateuses ou sarcomateuses et la survie dépasse rârement un an.

AMPUTATION DU RECTUM POUR UN CANCER BAS SITUÉ AVEC CONSERVATION SPHINCTERIENNE (Présentation du malade).—J. L. Petitclerc.

Nécessité du diagnostic précoce; importance d'un examen complet. Dans une statique américaine, un auteur a trouvé dans 28% de ses cas, un cancer du rectum chez des patients opérés récemment pour hémorroïdes.

Depuis au delà un siècle, il semble que la raison principale qui empêche les malades de se faire traiter au moment propice est la hantise de l'anus contre nature. D'où la tendance de la chirurgie moderne à conserver la fonction sphinctérienne.

Présentation du patient M.J.A.F., 58 ans, chez qui on a enlevé tout le rectum y compris le canal anal, après avoir sectionné, en avant et en arrière du rectum, et écarté les sphincters. Reconstitution de ceux-ci après suture du colon à la peau. La fonction des sphincters est parfaite mais le patient n'a pas la sensation de laisser passer les gaz intestinaux. Cette remarque coïncide avec ce que la grande majorité des auteurs qui ont employé la technique de Von Hochenegg ont observé.

Un point intéressant à noter est que ce patient a été opéré le 12 du mois d'août et qu'il a pu laisser l'hôpital le 28 du même mois avec une guérison per primam. Il s'agissait d'un épithélioma glandulaire.

Toronto Academy of Medicine

"Library and Historical Night" is an annual event in the Toronto Academy of Medicine. It combines a social function with a stated meeting of the Academy. This year the date fell on April 1. A dinner in the York Club before the meeting was attended by about fifty of the Fellows most of whom were accompanied by their wives. In the lecture room of the Academy Dr. Eric Linell chairman of the Library Committee and Dr. Noble Sharpe Chairman of the Museum Committee reported on the progress made during the year in their respective departments. Both stressed the need for extension of the existing accommodation. Should the castles in Spain they erected materialize the library and museum would be national assets. In time they may realize in part the attractive dreams that inspired their presentations. The guest of the evening was Professor T. F. McIlwraith, M.A., F.R.S.C., Professor of Anthropology University of Toronto. His subject was entitled "Where Champlain met the Hurons". He described the excavation of a 17th century town of the Hurons some nine miles west of Orillia and developed a fascinating story, illustrated by lantern slides, of the town of two hundred houses to which Champlain came on his first journey into the interior of Upper Canada in 1615. One of the revelations of the ossuary of this ancient town was the prevalence of dental caries and osteoarthritis.

In the enlightenment of modern times it has been accepted as a matter of course that the pursuit of science by independent research was a worthy endeavour. In our free and independent countries, scientists were encouraged to spend their lives searching for new knowledge. As representatives of this large group of scientists we should resist every attempt to curb the efforts of scientists to find new information. Science must be free. Wherever it has been controlled, it has been only partially productive. In an unsympathetic atmosphere, science withers and dies, and all mankind is the loser.—C. F. Kettering, *The Diplomate*, **19**: 94, 1947.

MISCELLANY

Prepaid Medical Care as a Social Need and a Medical Weapon

[*Who shall be responsible for schemes of prepaid medical care? The matter is discussed in the following article taken from the "Ontario Medical Review"*, **14**: 15, 1947, *by Dr. W. V. Johnston.*]

A successful scheme of prepaid medical care is dependent upon the public's enthusiasm for some protection against the hazards of accident and illness. A prominent busy doctor states that he does not meet with any such demand from his clientele, that they do not discuss it or enquire about it from him. He is doubtful about this hue and cry, and suspects it may be propaganda of some of his fellow practitioners whom he fears may have dangerous socialist views. May we try to answer this gentleman?

There are two parties involved—those who receive the services and those who give them. In speaking of the party of the first part, that is the public, we must observe that it always is very difficult to gauge precisely what they want. At election time our politicians propose measures they believe popular enough to win votes. It is their business to put a valuation on popular opinion. It is a difficult task and they make many mistakes. If politicians have difficulty in assessing the public mind, it is reasonable to suppose it is even more so for the rest of us. As an example, how few people two years ago expected Family Allowances and yet, in a few months, it was law, and now no government would dare repeal it.

There is a growing demand from the public for some release from the ever-present possibility of a costly accident or illness. The fact that they are so eagerly buying the contracts of commercial companies offering prepaid medical services here and in the United States, indicates this. On studying these contracts with all their exclusion clauses, one can see how better contracts could be offered, increasing their popularity.

This demand from the public is still largely unexpressed due to a lack of clarity in its thinking. This does not mean our citizens may not act quickly when once they realize they may have nearly anything they wish through the ballot box. There is a very interesting sentence in the American Declaration of Independence. It is this: "All experience hath shown that mankind are more disposed to suffer while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed". The Anglo-Saxon seems to have a deep lethargy to too sudden social changes.

As individuals we learn at a very uneven rate, muddling slowly through a problem until suddenly the solution becomes crystal clear. It is the same with the body politic. When people, through their government, decide to do something about a matter, such as medical costs, we may be sure they will do it with little warning, as in England. It is a fact that the electorate of England is still the most politically mature in the world.

Also, we may note that, when changes involving the social structure are made law, they are seldom reversible. I do not think you can name a major enactment of recent years in the fields of education or health, bringing benefits to a large percentage of the people, that was later abolished.

Many of our young people from service in the armed forces have caught a vision of a better Canada, for in the services many were fed better, clothed better, and better treated medically than they were in civilian life. If you do not believe this, think of the many men who had their herniæ repaired who otherwise would still have them. Many of these young folks know full well that there must be some way of getting the best that medicine has to offer when seri-

ously ill and spreading the costs thereof so it is not too burdensome.

Voluntary prepaid medical care is a partial answer to the social need of bringing the best of medical care to the largest number. I say a partial answer because, where it is already available, only about 20% avail themselves of it. Whether or not society will be satisfied with a scheme reaching this percentage of the people is another matter. However, it is a beginning and in the British tradition of going slowly.

The other party to any plan of prepaid medical care are those who provide it, namely the doctors. General practitioners particularly, are faced very often with the problem of getting adequate diagnostic and treatment services for patients who are unable to pay for them, or if they do pay, we know full well they will be handicapped in providing themselves with some of the necessities of decent living. For instance, many a parent with rheumatic fever, or arthritis, or exophthalmic goitre has had insufficient investigation and treatment because of the cost of it all. To say that this is no concern of doctors is no answer at all. We see the results of poverty and near poverty more often than most, and as citizens why not let it excite us to action?

Sometimes we are so limited in our efforts to get people well by a paucity of funds that we feel like the woodsman who, instead of cutting down trees, has spent his time thrashing around in the underbrush.

To say that our people are getting too prone to take advantage of free clinics, etc., and to get as much as possible for nothing, is an unhealthy viewpoint. Most of us desire the maximum social legislation without spawning parasites. I have never practised in the city but folks in the country and small towns are still essentially honest and wish to honour their debts. It seems to some of us that rugged independence frequently has been lost by the imposition of unbearable burdens.

In short, many doctors feel in many cases they could do so much more if the money factor could be ignored. It could be ignored largely if we had prepaid medical care. In other words this is a medical weapon.

In any scheme of prepaid medicine we all want the maximum of "free enterprise", consistent with good service. The principle of free choice of doctor must be kept as inviolate as possible. We admire the individualist, the man who has built a large practice by hard work and hard thinking. A widespread system of prepaid medical care will put some limitations on the doctor participating in that there will be a standardization of fees. Some of our men are such individualists they reserve themselves the right to assess their own worth and set their own fees.

In the O.M.A. fee schedule, the fee for each service is given as so much and up. There is a floor and no ceiling. The floor is to protect us from the public. A spirit of fairness requires a ceiling to protect the public from some of us. The unpredictably high fee to the wealthy may be justifiable, but to the average citizen it is hard to defend. At any rate the general practitioner has few opportunities to use the "and up" part of the schedule.

Some doctors ask: why start limiting our fees when others such as lawyers, lumbermen and landowners can reap without limit? This is really unanswerable because it is fundamentally wrong to make the rewards of practitioners of medicine less than those obtainable in other fields of endeavour. The attractions of medicine must be as great as those offered anywhere, in order to appeal to our sons and others who come after us. However, we must note that governments today, in nearly all English speaking countries, feel that more and more they must take control of two departments of welfare, namely: education and health. In this way, willy-nilly we are becoming involved.

To doctors, prepaid medical care is a part of the larger field of welfare and a medical weapon. To develop this weapon, we must go into the political and governmental fields more and more. This is inevitable, and it is only right that we go there, if for no other reason than to protect ourselves. We are all familiar with the struggle of the teaching profession to get proper status and remuneration for its members from society. This fate must not overtake us. May we make a plea that the general practitioner, who comprises about 85% of the Ontario Medical Association, be the member of the medical team that leads the way in its thinking and actions in helping to bring better medical care to the public, and while doing this, preserve some of the precious gifts entrusted to us now. Prepaid medical care, with its many reasonable features, is one answer.

The public are asking for some method of being able to pay for the most expensive features of medical care, and thereby preserve their independence and self respect. The doctors are asking that, in doing this, we keep the profession of medicine attractive to the keenest minds amongst us. How well can we weave these threads into the social fabric? This is the challenge to all of us.

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[*The Ontario Medical Association has held a plebiscite amongst its members on the question of prepaid medical care within the past year. The tentative conclusions to be drawn from the results were as follows*:]

A. The proposal that the Ontario Medical Association should organize and operate a Plan for the provision of voluntary prepaid medical care must be abandoned. This was because the majority in favour of operation of a Plan for voluntary prepaid medical care by the Ontario Medical Association is less than two-thirds of those expressing an opinion. A majority of two-thirds of the members of the Association, who cast a ballot, would be necessary to adopt a by-law permitting the Association to operate a Plan for voluntary prepaid medical care. The questionnaire indicates that it is unlikely that such a majority could be obtained at any meeting of the members, even if proxy voting could be arranged.

B. For a similar reason the Ontario Medical Association must oppose the organization and operation of a Plan for the provision of voluntary prepaid medical care by the Ontario Hospital Association.

C. The Ontario Medical Association must sponsor the organization of a Province-wide plan for the provision of prepaid medical care by members of the medical profession, since by a very large majority of those answering the questionnaire the doctors of Ontario have signified their approval of the principle of voluntary prepaid medical care, and of the control of plans for this by the medical profession.

D. The governing body of this Plan must be so constituted that at least 50% of its members are representatives of the Ontario Medical Association. In this way the Ontario Medical Association would have a large measure of control of the Plan—as is desired by the majority of those replying to the questionnaire.

E. A satisfactory arrangement might be the consolidation of the various existing plans or the enlargement of one of the existing plans under a governing body constituted to satisfy the aims as suggested in the plebiscite.

World Health Conditions

[*An editorial from "The Bulletin of the Vancouver Medical Association", February, 1947.*]

We wish that every medical man in Vancouver, indeed, in British Columbia, could have heard Dr. Routley, General Secretary of the Canadian Medical Association, when he spoke recently before a luncheon meeting, called by the B.C. Medical Association's Executive. He told us, in a necessarily very condensed form, things that should shake us out of any complacency

from which we may be suffering, and should make us, not only very uncomfortable, but very much alive to the dangers that beset us, and to the duties that confront us, as doctors first, as Canadians second, and finally as citizens of this rapidly-contracting world.

Dr. Routley is well qualified to speak. He is rapidly becoming one of the outstanding figures in international medicine. He is the trusted representative, not only of the Canadian Medical profession, which knows him well and trusts him implicitly, but of the Canadian people as a whole, since the Canadian Government commissioned him in the beginning, and has been adding duties to his already onerous tasks, as it learns to depend on his competence and his capacity for leadership and initiative. So that we must take very seriously what he says. We, in this most sheltered and most highly-favoured corner of the one untouched area of the world, have ourselves little knowledge or understanding of the absolute chaos and disaster that exists in huge sections of this same world. Dr. Routley has such a knowledge, since day by day he has met with men who represent these areas. Ethiopia, where the Italian murderers killed every doctor and every nurse, except one doctor, the now sole representative—Czechoslovakia, which has lost 60% of its medical profession; Poland, which has one medical school; China, which for a population of 400,000,000 souls, has 9,000 doctors, of whom only 3,000 have had any medical training at all; Liberia, which for its 2,000,000 inhabitants, has one doctor; Germany, where utter despair and helplessness has overwhelmed the medical profession.

How can we hope for prosperity, for health, for happiness for ourselves, and still more for our children, when this dreadful, black cloud of misery and despair and defencelessness in the face of disease, hangs over our heads? Others are enveloped in this fog and grope helplessly in it—it may roll in and engulf us at any minute.

But Routley and men like him on the various World Committees on which he is serving, are doing something about this, and it is high time something should be done. They are formulating and working out two great organizations, a World Health Organization, and a World Medical Association. Their objective is the same —though they work on somewhat different, though parallel lines. This objective is to assure to all the people of the world by all means available, whatever is necessary to enable them to attain the maximum degree of health.

This sounds something like Utopia—but we must, as Dr. Routley urged us to do, get two things firmly into our minds. First, that this *must* be done. If it is not done and done completely and properly, nobody can gauge the size of the disaster that threatens mankind—in the way of disease and death. And mankind, not the unfortunate in China, Ethiopia, Liberia, and war-torn Europe, but us, ourselves, here in Canada. Because it is going to mean war, too, and we are going to be right in the middle of the next war, if it comes.

The second thing is, that it cannot be done by pious resolutions, or by governments alone, though they are doing their best to lead us. It must be done by individual faith and effort: by the concerted effort of individuals. By the medical profession of Canada, through its great Association, of which Dr. Routley is so able a representative. He told us of the great effort the American Medical Association is making. But the first thing is that each of us should realize what the challenge is, and should realize how vitally he himself is affected. It is not an academic question, that we can take time to consider, and then appoint a Committee to deal with it. We have no time.

In fact, we almost wish we had never gone to that luncheon. But we think that this message of Dr. Routley's should be repeated again and again, till no man can have the excuse that he did not know the facts, because nobody told him of them. We hope that some way will be found whereby these facts, and the challenge they present, may be put squarely before every member of our profession. If we want to be free and remain free, it is high time we knew the truth, which alone can ensure such freedom.

POSTGRADUATE MEDICAL TRAINING IN GREAT BRITAIN

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There is a great variety of interesting opportunities for postgraduate medical training in Great Britain at the present time, and a consistent effort is being made to extend and improve them. The standard of medical practice has been well maintained despite the difficulties of war, and due emphasis is being laid on clinical research.

Graduates from the Dominions are welcomed and in some cases even given preference over local applicants. There are a great many students in Britain at present from New Zealand, Australia, India, South Africa and various European countries. There are probably one hundred Canadians in Great Britain at present taking postgraduate training.

Long-term courses are available at the British Postgraduate Medical School at Hammersmith (Ducane Road, London, W.12) and from the Edinburgh Postgraduate Board for Medicine (Teviot Place, Edinburgh 8). The Edinburgh courses are sponsored jointly by the University and by the Royal Colleges of Physicians and Surgeons of Edinburgh. The course in Internal Medicine extends over approximately eleven weeks and the course in General Surgery eighteen weeks. These courses are repeated twice each year and are designed as a preparation for the examinations for the higher qualifications. They consist of lectures, clinical demonstrations and ward teaching. The teaching at Hammersmith is continuous and is not specifically designed for examination purposes. It is perhaps more clinical. Students may enroll for any period but longer-term students are preferred and courses of up to three years' duration are planned (Internal Medicine, Surgery, Obstetrics). In both these centres there are many additional facilities for study including medical library, pathological museum, special lectures, private tutors etc. Fees in each case are moderate.

Most students coming to Great Britain will be interested in the examinations for the higher qualifications. In every case these examinations demand a detailed knowledge of the fundamental sciences applicable to the subject, as well as clinical judgment. Much of the preparation can be done at home. Qualifying examinations for the Membership of the Royal College of Physicians of London, or of Edinburgh, are held quarterly, and consist of two papers followed by orals and practical.

The examination for Fellowship of the Royal College of Surgeons Edinburgh is held quarterly. It is expected that this examination will be divided into two parts—Primary and Final—some time in 1948. No official announcement has yet been made.

The examination for Fellowship of the Royal College of Surgeons of England is in two parts—Primary (Anatomy and Physiology) and Final (Surgery, Surgical Anatomy and Pathology). The two parts can be taken in sequence without any given time interval.

For the surgical degrees, candidates must have had two years' postgraduate experience. These examinations are said not to be competitive but of the large number of candidates "going up" each time a consistently low proportion is successful. Candidates who plan to sit these examinations should bring with them documentary evidence of qualification.

Courses leading to a diploma in Public Health are available at eleven different centres in Great Britain and usually require about two years. The National Health Bill will introduce, in 1948, complete govern-

mental control of all medical services. For graduates interested in medical economics, this should be a most interesting plan to observe at close range.

Several of the British universities give courses of about two years' duration leading to a Diploma in Psychiatry or Psychological Medicine.

The University of Liverpool offers a two-year course leading to the degree Master of Orthopædic Surgery. This is restricted to candidates with a high standard of training in General Surgery.

Courses in Pathology; Pædiatrics; Eye, Ear, Nose and Throat; Radiology; Anæsthetics, etc. are arranged more or less on an individual basis with the Deans of Faculties of Medicine at the various university centres. Candidates may arrange programs of study and clinical appointments qualifying for diplomas in these specialties.

The Royal College of Physicians of London and the Royal College of Surgeons of England (jointly) grant Diplomas of Anæsthetics, Child Health, Laryngology, Ophthalmology, Otology, Physical Medicine, Psychiatry and Public Health.

For students of Obstetrics and Gynæcology, the higher qualification is the Diploma of Membership of the Royal College of Obstetricians and Gynæcologists. Courses are available at Hammersmith and at the Rotunda in Dublin, Eire. There is ample opportunity for hospital experience.

In addition to these long-term courses, there are various short courses given from time to time, covering specific subjects. These are announced in the medical press. In the London area, many such courses are organized by the Fellowship of Postgraduate Medicine (1 Wimpole Street, London, W.1). Canadians coming to Great Britain will be welcomed at many of the large hospitals and clinics where they may observe the work being done.

Sir Francis Fraser, Secretary, British Postgraduate Medical Federation, 2 Gordon Square, London, W.C.1., is responsible for integrating the postgraduate training in Great Britain.

In regard to clinical appointments, there are usually many applicants for each post. Many British graduates are doing advanced training at present in anticipation of the new scheme for medical services. In some hospitals a Canadian applicant is given preference because a predecessor has acquitted himself well. Candidates with a higher qualification have no difficulty in securing residencies which provide extensive opportunities for clinical practice. The compact population and the centralization of medical services bring a wealth of clinical material into the medical centres. Such positions are better paid in Great Britain than in Canada. The industrial centres of the Midlands (Manchester, Birmingham, Liverpool) offer most of the opportunities but the Municipal Hospitals in London and the adjoining Middlesex County provide some very excellent clinical positions. Any Canadian intending to take such an appointment will need to register with the General Medical Council of Great Britain. Reciprocity exists between Great Britain and the Provinces of Prince Edward Island, Nova Scotia, Manitoba, Alberta, and also with Newfoundland.

In regard to administrative detail, to use army parlance, trans-Atlantic passages are not difficult to arrange (single fare about $200). Air passage is readily available. The cost of living in Britain is higher than in most urban centres in Canada. Housing and fuel shortages are acute but room and board is usually to be found at the University Centres and hospitals provide good accommodation for staff. Food rations are adequate but monotonous.

The British Council is eager to help prospective visitors to Britain. Through this agency a limited number of scholarships are available for advanced study. The Department of Veterans' Affairs maintains an office at 13-17 Pall Mall East, London, S.W.1, through which post-discharge training grants are administered.

One is constantly meeting Canadian graduates in this country and they are invariably enthusiastic about the value of the training they are receiving.

Pierre Janet, M.D.

Pierre Janet has died in Paris at the age of 87, and the world has lost one of the greatest clinicians of our age in psychological medicine. A pupil of Charcot, he had learnt to recognize the existence of psychogenic disorders as distinct from physical, for Charcot has experimentally reproduced under hypnosis disorders like hysterical paralysis. No one has had a wider experience than Janet of such disorders, nor was there a more acute observer. His description of the clinical manifestations of these disorders surpass in extent and accuracy anything that we have elsewhere.

Janet's idea as to the nature and origin of the psychoneuroses, based as they were on his earlier philosophic studies, are the common-sense theories most acceptable to the ordinary medical practitioner, especially as he fulfils more than any other clinician of the past the modern demand that the human personality of mind and body should be treated as a unity. He viewed the personality as a synthesis of all our impressions and experiences in life. At any special time we have a certain amount of vital energy. If that energy is at a high level the personality functions as a synthesis, we feel fit for anything and capable of meeting all our responsibilities in life; if at a low level, we shrink from life and feel it a burden even to entertain a friend. The psychoneuroses are due to a lowering of the psychological level so that the personality ceases to function as a whole. When there is simply a lowering of psychological tension the personality is enfeebled, so that we have the condition of psychasthenia (obsessions, neurasthenia, etc.) with indecision, lack of adaptation, and withdrawal from reality. (We all know that we are more liable to neurotic reactions when we are run down.) In other cases the tension is so low that the personality instead of maintaining itself as a synthesis falls apart, in which case there appears dissociation or splitting of the personality, as in hysteria, somnambulism, and so forth.

Janet's theory of dissociation, therefore, differs from that of Freud. In Janet's view it is the result of lack of energy to hold the personality together, whereas according to Freud dissociation is due to active repression of what is unpleasant. The lowering of psychological tension is sometimes constitutional, sometimes due to illness, sometimes due to emotional strain, or to psychological causes like worry. It is this linking up of the physical, emotional, and psychological factors by Janet which appeals to the ordinary physician as being philosophically sound "common sense", and it is surprising that he has not more adherents in the medical profession in this country. But the great vogue of Freud, and his derivatives, is probably to be found not only in his deeper investigations into the causes of neurosis and their purposive nature but in the fact that his methods have secured better therapeutic results than those of Janet. Both of them revived the original trauma which caused the hysterical symptoms, both (at first) used hypnosis to do so, and both got emotional responses; but Freud got results by his method of abreaction while Janet was not so successful. We can only suggest that this difference was due to the fact that, while both revived the experience and the emotion, Freud linked it up with the conscious mind by getting the patient to "talk it over" afterwards, with the result that the dissociation was "reduced", whereas Janet does not appear to have done so, so that both the dissociation and the symptom persisted. But psycho-analytic theories would be none the worse for some of the balance of Janet's philosophic views which are at the same time practical and convincing. Let us hope that Janet's death may stimulate in this country a renewal of interest in his works, which are well worthy of study.

Pierre-Marie-Felix Janet was born in Paris in 1859, and took his degree in philosophy in 1882, and his M.D. in 1893. He was attached to the Salpêtrière, and then appointed to the University, ultimately becoming Professor at the Sorbonne from 1898 to 1902. From then onwards he devoted most of his life to research, became

President of the Académie des Sciences Morales et Politiques in 1925, and gave many lectures abroad. —J.A.H., *Brit. M. J.*, March 8, 1947.

CANADIAN MEDICAL WAR SERVICES

Medical Advisory Committee Department of Veterans' Affairs

The Right Honourable Ian Mackenzie, P.C., Minister of Veterans' Affairs, has announced the appointment of a Medical Advisory Committee to the Department, this Committee to advise the Department regarding general policy in the medical treatment of veterans, particularly in relation to the calibre of the medical men employed and the type and character of treatment provided. The Committee will also advise regarding the furthering of the present excellent University-D.V.A. co-operative relationship and the happy administrative functioning of the Doctor of Choice Plan.

The following doctors have signified their willingness to serve on this Committee: Dr. Louis Berger, Quebec; Dr. J. B. Collip, Montreal; Dr. Edmond Dube, Montreal; Dr. R. F. Farquharson, Toronto; Dr. W. E. Gallie, Toronto; Dr. A. H. Gordon, Montreal; Dr. Duncan Graham, Toronto; Dr. G. E. Hall, London; Dr. C. Holland, Halifax; Dr. M. R. Levey, Edmonton; Dr. A. B. Schinbein, Vancouver; Dr. Digby Wheeler, Winnipeg; Dr. Wallace Wilson, Vancouver.

Mr. Mackenzie stated that the advice and recommendations of the Committee will be made available to the Director General of Treatment Services, Dr. W. P. Warner, in regard to various matters as suggested above, pertaining to the treatment of veterans. It is also anticipated that advice will be received regarding the best means of utilizing the very valuable clinical records available on ex-service personnel so that clinical studies may be undertaken regarding the origin and course of battle injuries and also diseases having their origin in service.

The Minister and the officials of this Department have expressed their appreciation of the co-operation which the medical profession in Canada has given the Department in providing medical services for veterans and the hope that this happy relationship will continue.

MEDICAL OFFICERS APPOINTED TO THE R.C.A.M.C.—ACTIVE FORCE

JANUARY AND FEBRUARY, 1947

(Previous sections in January, March, April, May, June, July, September, October, November and December, 1945 and January, March, May, June, July, August, September, October, November and December, 1946 and January, February, March, 1947.)

SECTION LXXXIX

Name	*Address*	*Date of appointment*
Hetherington, R. N.,	(Address not known)	30-12-46

MEDICAL OFFICERS STRUCK OFF STRENGTH OF THE R.C.A.M.C.—ACTIVE FORCE

SECTION XC

Name	*Address*	*Date struck off strength*
Bennett, W. D.,	59 Rose Park Drive, Toronto	6-1-47
Bradshaw, A. K.,	8621-108A Street, Edmonton	22-8-46
Cahn, C. H. W.,	64 Admiral Road, Toronto	29-11-46
Chabot, C.,	Ste-Claire, Dorchester Co., Quebec	10-12-46
Cote, P. E.,	166 Ave., Bougainville, Quebec, Que.	6-7-46
Edward, J. F.,	149 Lansdowne Ave., Winnipeg	30-12-46
Fryer, G. E.,	351 Cambridge St., Winnipeg	12-12-46
Grundy, E. C.,	873 Kildare Rd., Windsor, Ont.	28-12-46
Hardy, B. C.,	77 Balsom Ave., Toronto	10-12-46
Hogg, F. J.,	R.R. No. 1, Dundas, Ont.	9-12-46
Hubbell, D. E.,	Thamesville, Ont.	7-12-46
Kidd, E. G.,	10930-87th Ave., Edmonton	23-1-47
Knox, H. C.,	Children's Memorial Hospital, Montreal	6-1-47
Lecot, A.,	Ninette, Man.	18-1-47
Montemurro, G. A.,	Streetsville, Ont.	9-11-46
Murphy, W. O.,	30 Lower William St., Kingston, Ont.	22-1-47
Percheson, P. B.,	126 Rowand St., Fort William, Ont.	21-12-46
Powers, A.,	Rockland, Ont.	24-12-46
Richard, V.,	90 Joffre Ave., Quebec City	2-12-46
Ross, D. C.,	400 Annette St., Toronto	20-12-46
Shusterman, M.,	233 Quenn St., W., Toronto	13-12-46
Sleath, G. E.,	4324 Ledger St., New Westminster, B.C.	6-12-46
Smith, J. D.,	Cooksville, Ont.	28-1-47
Spring, W. B.,	128 Ava Road, Toronto	8-1-47
Sternicki, O. M.,	466 Spence St., Winnipeg	6-1-47
Stewart, N. A.,	10 Starre Ave., Toronto	27-11-46
Teichman, J. G.,	211 Beverley St., Toronto	9-1-47
Turner, K. P.,	1210 3rd Ave. N.W., Moose Jaw, Sask.	28-12-46
Walker, W. J.,	Stirling, Ont.	8-1-47
Walsh, F. E.,	P.O. Box 577, Springhill, N.S.	31-12-46
Wiggins, R. L.,	11015-88th Ave., Edmonton	23-1-47
Young, A. F.,	Box 23, Emo, Ont.	18-1-47
Ziskrout, I.,	26 St. John's Place, Toronto	10-12-46

Discharged Overseas

Dalziel, D., 236 St. George St., Toronto.
Kay, S. K., 412 Pritchard Ave., Winnipeg.
King, F. G. E., 32 Murray St., Brantford, Ont.
Winter, H., 47 Barton St., Toronto.

CORRESPONDENCE

Irresistible Impulse and Crime

To the Editor:

I have read with interest Dr. C. M. Crawford's letter in the November issue of the *Journal*, and would comment as follows:

1. My article in the April issue of the *Journal* touched on both sides of the question at issue, but I do not agree that it was "contradictory". Moreover, I think that Dr. Crawford may have misread the quotation from Chief Justice Gibson (in *Mosler's* case) with which I concluded the article. The judge did not say that the irresistible impulse defence should be rejected in every instance. He said that it "can be recognized only in the clearest cases".

2. Dr. Crawford seems to agree with Dr. Stevenson that the average jury is incapable of deciding the insanity issue, and he also cites with approval the Briggs Law of Massachusetts. That law was enacted in 1921, and has been amended several times. Apparently it received rough treatment in the legislature, and has had its share of criticism (see Weihofen, *Insanity as a Defence in Criminal Law* [U.S. 1933] page 405 *et seq.*). It did not abolish the jury system in insanity cases, and while it has received some favourable support, proposals to introduce similar legislation in certain other jurisdictions appear to have been rejected.

3. Some time ago I was asked by Mr. G. V. V. Nicholls, editor of the *Canadian Bar Review*, to write an article on Section 19, and it is due to appear in the next issue of the Review. In that article I referred *inter alia* to the suggestions of Dr. Stevenson and Dr. Crawford, and mentioned the former's proposal of a conference between committees of the Medical and Bar Associations to discuss this vexed question from both

medical and legal points of view. I understand that off-prints of the article will be sent to Drs. Stevenson and Crawford in due course. In the meantime I wish to express my view that any proposal to abolish the jury trial procedure would merely weaken the case of the psychiatric profession. In my opinion the only prospect of amending the law in the reasonably near future lies in a possible amendment to Section 19 by adding to the existing rules some modified recognition of the insane or irresistible impulse defence. That there is formidable opposition even to an amendment along those lines is evident from an examination of the jurisprudence at present in force in England, Canada and in many of the American States. W. C. J. MEREDITH, K.C., M.A.

Fractures of the Mandible

To the Editor:

I am greatly interested in Dr. McInnes' concern with the present status of the treatment of fractures of the mandible as he expresses it in your March issue, page 314. In fact, I am deeply concerned with his presentation to the medical profession, through the medium of your pages, of a method that, but for his excellent surgery, the grace of God and penicillin, must have ended in catastrophe.

The "common method" he so readily condemns, is to accept the unbroken upper jaw as the splint for the broken lower jaw whenever possible. There is no other instance in the realm of surgery where a correct and anatomically accurate splint is at hand and waiting to be used. The technique of such splinting is simple, straightforward, taught in our dental schools and is better understood and applied in general by our dentists than by their surgical confrères. In the Montreal General Hospital we see about 100 broken jaws a year. In the past twelve years, about a thousand broken jaws have been under my supervision. Of these, 75 to 80% have been treated by this common method. The remaining 20 to 25% have been "problem fractures" and largely treated by double pinning, direct wiring, etc. In desperation we might turn to the Lane plate as advocated by Dr. McInnes, but have not yet seen the indication for its use.

More power to the "open minds" of members of the Sudbury surgical staff, but let's get straight the facts that keep these minds open. The "facts" as Dr. McInnes presents them are fiction. He claims: "The common method in use today, that of wiring the jaws together, is by no means satisfactory and is a cause of a great deal of morbidity and danger to the patient." On the contrary, this common method is very satisfactory, has little or no morbidity and presents no danger to the patient. He proceeds: "It is a tedious and time-consuming job, very often marred by poor fixation and occlusion." One cannot deny the tedium but the time consumption is to the extent of about half an hour and the fixation is usually good and the occlusion excellent. Dr. McInnes asks us to agree "that general anæsthesia for wiring teeth is dangerous and that on the whole, patients are not happy under local anæsthesia." General anæsthesia is not even indicated in the splinting of the majority of jaw fractures. For that matter, neither is his unhappy local anæsthesia. The vast majority of jaws are splinted to the best advantage with the sedative effect of a small dose of morphine—the procedure is not painful. In the occasional case when general anæsthesia is indicated, if one is apprehensive about the anæsthetic recovery, cross tie wires and elastics may be left off to be placed when the patient regains consciousness.

I should like to commend Dr. McInnes on his surgical skill and the technical excellence of his application of two vitallium plates for bilateral fracture of the mandible. To my knowledge this is the first reported case of such a procedure. But let the commendation stop there and let's not recommend these 1½ inch incisions bilaterally, through dangerous anatomic areas, in preference to the "common method in use today".

JOHN GERRIE,
Associate Professor of Oral Surgery.

March 27, 1947,
McGill University, Montreal.

SPECIAL CORRESPONDENCE

The London Letter

(From our own correspondent)

TWO FAMOUS PHYSIOLOGISTS

The ranks of British physiologists have been sadly depleted by the death within a few days of each other of Sir Joseph Barcroft and Professor B. A. McSwiney. In both cases death occurred with tragic and unexpected suddenness. Sir Joseph Barcroft, who was in his 75th year, died while travelling home from his laboratory. Professor McSwiney, who was only in his 53rd year, was convalescent from an attack of pneumonia and apparently completely recovered when his death occurred with startling suddenness.

Representing two different generations of physiologists, each had made a world-famous name for himself—Sir Joseph in the field of oxygen-carriage of the blood and its associated problems, and Professor McSwiney in the field of the physiology of the gastro-intestinal tract, particularly in relation to sensation. Sir Joseph, who held the chair of physiology at Cambridge from 1925 to 1937, had been as active in retirement as he had been when holding the chair, and it was only last October that he published the first volume of his *Researches in Pre-natal Life*. Professor McSwiney, who held the chair of physiology at St. Thomas's Hospital, had just reached the zenith of his powers, and in his case not only has physiology lost one of its foremost exponents, but the University of London has lost one of its most trusted advisers in the sphere of medical education.

PENICILLIN CONTROL

In spite of the profession's growing dislike of governmental controls, there has been a general welcome for the Penicillin Bill which is now passing through Parliament. The aim of the Bill is to forbid the sale of penicillin and "such other anti-microbial organic substances produced by living organisms" except on the prescription of a doctor, dentist or veterinary surgeon.

In introducing the Bill the Government is acting on the advice of its advisers and also of independent authorities of the standing of Sir Alexander Fleming. The three main reasons advanced for preventing the indiscriminate use of penicillin are: such indiscriminate use would lead to the development of penicillin-resistant organisms as a result of under-dosage; self-treatment by patients with venereal disease; and the risk of dermatitis and oral ulceration from the local application.

The Bill is so worded that with slight modifications, that will almost certainly be incorporated during its passage to the Statute Book, it will do nothing to hamper the legitimate use of penicillin, while at the same time effectively preventing its abuse by the public. It is an interesting sign of the times that the Bill should have been so drafted as to include any forthcoming antibiotics. The main one in mind, apart from penicillin, when the Bill was drafted, was, of course streptomycin. According to the Minister of Supply the present production is small but it is hoped that by June it will be about 250 gm. per month. In spite of the disappointing state of affairs the Medical Research Council has already organized clinical trials at selected hospitals in certain types of cases of tuberculosis.

MEDICINE AND DELINQUENCY

A recent appeal for funds has drawn attention to the invaluable work performed by the Institute for the Scientific Treatment of Delinquency since its foundation some fifteen years ago. The Institute owed its origin to a Medical Research Council Report, *Studies in the Psychology of Delinquency*, published in 1932, which first clearly crystallized the evidence showing that psychological principles, both in diagnosis and treatment, were as applicable to the criminal and delinquent as to the more law-abiding sections of the community. Seven years later, just before the outbreak of the second world war, Dr. Norwood East and Dr. W. H. deB. Hubert published their equally valuable report on *The Psychological Treatment of Crime*. Written with that dispassionate objectivity that has always distinguished the work and writings of the senior author, this report was particularly valuable in that it was as emphatic in drawing attention to the shortcomings of psychological forms of treatment as it was in reporting its successes. This same high standard has marked the work of the Institute since its inception, and during the fifteen years of its existence it has largely been responsible for the changing attitude to the criminal. The doctor will never replace the judge, but the work of the Institute has shown that in the treatment of the criminal or delinquent the doctor can do much to assist the courts in deciding upon a course of action that, while fully subserving the prime aim of protecting the community, will at the same time give the prisoner every opportunity to become a useful member of that same community.

SOCIAL MEDICINE

The second annual report of the Institute of Social Medicine at Oxford is a striking commentary upon the progress that has been made in this new branch of medicine under the directorship of Professor John Ryle. Among the problems being investigated are the epidemiology and etiology of social diseases such as rheumatic fever and peptic ulcer, occupational mortality, and the growth of the pre-school child and the adolescent. In addition the Director has been requested to organize all teaching in social medicine and public health for medical students.

The case for social medicine as an academic subject has been ably expounded by Professor Ryle himself at the recent centenary meeting of the New York Academy of Medicine, and there is little doubt that his pioneer efforts in this field are proving successful. As a distinguished clinician he is in a very strong position to win over those clinicians who, rightly or wrongly, feel that social medicine is such an integral part of the practice of medicine that it is impossible to separate it off as a speciality of its own.

There is another school of thought over here that feels that in these days when the trend of political thought is to emphasize the community at the expense of the individual, there is a very real danger of social medicine running counter to the old Hippocratic traditions upon which the whole of our medical ethics and standards have been built. Here again the high professional standing of the Director of the Oxford Institute is of outstanding value in countering any such tendency. WILLIAM A. R. THOMSON

London, April, 1947.

"It is impossible to find a good physician who is not at the same time a good physiognomist."—J. C. Lavater.

ABSTRACTS FROM CURRENT LITERATURE

Medicine

Rheumatoid Spondylitis: A Study of 1,035 Cases. Polley, H. F. and Slocumb, C. H.: *Ann. Int. Med.*, **26:** 240, 1947.

A study of more than 1,000 cases of rheumatoid spondylitis encountered at the Mayo Clinic has yielded data which may help to clarify certain aspects of this disease and may help the physician to answer a few of the questions frequently asked concerning the condition. In the authors' series of cases the ratio of men to women was nine to one. Symptoms of 80% of patients first appeared when they were between the ages of 15 and 35 years. The average age of onset in this series was 26.7 years. The first symptoms were most frequently in the lower part of the back or lumbar region, next the region of the hip and thirdly, the thoracic region, with a few specifying the neck and shoulder girdle. In 72% of the cases studied exacerbations and remissions were a characteristic feature of the course of this disease. In 28% a fulminating progressive course without remissions occurred.

Limitation of motion in the cervical portion of the spinal column was noticed in 45% of cases after an average duration of symptoms of eight and one-half years. Transitory symptoms in the region of the neck had been present in an additional 12% of cases. Involvement of the hip joints was noted in 28% of patients. The joint damage was bilateral in three-fourths of the whole group.

The sedimentation rate does not tend to be as high in rheumatoid spondylitis as it is in peripheral rheumatoid arthritis, although at times high readings may be seen in the former. Roentgenologic evidence of rheumatoid spondylitis may be lacking if the progress of the disease has not resulted in destruction of cartilage and subchondral bone. When present, the characteristic roentgenologic findings in rheumatoid spondylitis are arthritis of the sacroiliac and apophysial joints, calcification or ossification or both of spinal ligaments and osteoporosis of vertebræ. S. R. TOWNSEND

Specific Dynamic Action as a Means of Augmenting Peripheral Blood Flow. Gubner, R., Di Palma, J. R. and Moore, E: *Am. J. Med. Sc.*, **213:** 1, 1947.

Following the lead given by Sir Thomas Lewis that there is no means of securing peripheral vasodilatation, "so persistently potent as warming of the body", these authors have experimented with the endogenous heat produced by the specific dynamic action of the amino acid glycine. The dissipation of the heat produced by the chemical reactions involved is secured by peripheral vasodilatation, a linear correlation existing between the metabolic rate and peripheral blood flow.

In the experiments retailed, 20 grams of glycine were administered in suitably flavoured milk or water and the peripheral circulatory dynamics studied. Rises in skin temperature of 2 to 4° C., in the toes occurred in all the normals studied while in three of four cases with peripheral vascular disease increase of two degrees or more were brought about. The increase began one hour after the ingestion of glycine, the maximal rise being between the second and third hours. Greater response was obtained following the amino acid than after the taking of alcohol or after peripheral nerve block. In the normal subjects the maximal skin temperature rise possible appears to have been achieved.

There was an average increase in oscillometric readings of 25% in normal cases with no increase in this value in three cases of peripheral vascular disease studied, though significant rises in skin temperature occurred in two. Increase in blood flow was found in either the hand or foot in eight of ten cases studied and in the two in which this change was not observed,

one failed to show an increase of oxygen consumption suggesting that the specific dynamic action of the amino acid had not occurred, while, in the second, the extremity tested had already undergone sympathectomy and was presumably already at maximal dilatation. Venous filling was seen to occur significantly faster following glycine ingestion.

The authors compare intravenous hypertonic saline injection as a vasodilating agent with the glycine ingestion. While pointing out that the duration of increased blood flow associated with hypertonic saline injection usually lasts only during the time that the intravenous infusion is being given, they make the further comment that there is an increased heat production entailed with intravenous hypertonic saline administration and believe it possible that the effects may be due to a parallel mechanism to the action of glycine, namely, a simple increase in the amount of heat produced in the body.

It is concluded that the ingestion of glycine provides a simple physiologic means to accomplish an effective and sustained increase in the peripheral blood flow.

G. A. COPPING

Surgery

Effect of Œstrogenic Hormone on Advanced Carcinoma of the Breast. Herrmann, J. R. *et al.*: *Arch. Surg.*, **1:** 54, 1947.

Favourable results from the use of œstrogenic hormones in some cases of advanced carcinoma of the breast obtained by British investigators, prompted the authors of this article to try this therapeutic procedure, on 17 selected patients for study. Thirteen had primary inoperable cancer of the breast for which no previous therapy had been administered. The patients had recurrent lesions in the same breast several years after treatment of inoperable carcinoma by irradiation. Of the remaining two patients of this group, a carcinomatous ulcer had developed in the mastectomy scar of one and recurrent nodules in the skin of the thoracic wall in the other. All of these patients were treated with ethinyl œstradiol, 0.15 to 0.7 mgm. daily. The ages of the patients ranged from 40 to 77 years. Seven of the seventeen patients died of the disease from four to eighteen months after the initial use of œstrogen therapy. One died of coronary occlusion six weeks after treatment. Five were less than 60 years of age. Seven of the total number of patients or 40% showed some clinical improvement. This favourable response occurred predominantly in women over 60 years of age. There was suggestive evidence that in young women œstrogenic hormone may hasten the progress of the disease. Hyperglycæmia was decidedly reduced in one patient, solely, by the use of œstrogen. G. E. LEARMONTH

Advantages and Limitations of Thiouracil Therapy in Thyrotoxicosis. Fowler, E. F. and Cole, W. H.: *Surg., Gyn. & Obst.*, **84:** 350, 1947.

Reactions to thiouracil in 9 to 13% of patients have placed limitations on its early promise. Most serious is agranulocytosis. Leukopenia is more common, and vomiting, dermatitis and pruritis are also encountered. Its greatest usefulness has been in severe toxic goitre where preparation with iodine is insufficient for bilateral thyroidectomy. Especially is it indicated in cardiac failure due to hyperthyroidism. The mortality rate due to thiouracil in 1,543 cases was reported as 0.45%. The action of the drug in eliminating thyrotoxicity is very slow, and it is an uneconomical method of preparing mildly toxic patients for operation.

A dosage of 200 milligrams three times a day for three weeks, then decreasing amounts, is recommended. The patient and his white count is carefully watched. Thiouracil should be stopped four days before operation. The basal metabolic rate drops about one point per day on thiouracil treatment, but it is slower in nodular toxic goitre. Remission is unlikely with less than six months' treatment and many of these have recurrences.

It is the conclusion of the authors that mild hyperthyroidism is best treated by iodine and throidectomy. Propylthiouracil, a new drug, appears to be less toxic and much superior to thiouracil. BURNS PLEWES

Patent Omphalomesenteric Duct and its Relation to the Diverticulum of Meckel. Kittle, C. F. *et al.*: *Arch. Surg.*, **10:** 54, 1947.

The patent omphalomesenteric, or vitelline, duct is a rare anomaly. Two patients with complete patency of the omphalomesenteric duct were treated at the University of Chicago Clinics and were the only patients with this condition in over 30,000 births at the Chicago Lying-in Hospital of the University of Chicago, during the past ten years. The authors review and summarize the 104 cases of this condition available in the literature and present the case histories of their own two patients. Historical data, embryology, anatomy and pathology, heterotopia, sex incidence occurrence with other congenital lesions, clinical pathology, clinical history, diagnosis and treatment are fully covered. They conclude that operation for excision of the patent omphalomesenteric duct should be undertaken as soon as the condition is diagnosed, to avoid the hazard of intestinal prolapse. G. E. LEARMONTH

Clinical Experiences with the Use of Penicillin Treatment of Infections Involving Bones and Joints. McCorkle, H. J., Silvani, H. and Warmer, H.: *Surg., Gyn. & Obst.*, **84:** 269, 1947.

During this investigation 87 patients were studied. All had bone and/or joint infections and were treated with penicillin. Acute hæmatogenous osteomyelitis responded well to intramuscular penicillin since all organisms cultured were sensitive. The earlier treatment was instituted the more rapid the response. Aspiration of abscesses and the instillation of penicillin was usually successful, but several large abscesses were drained surgically. Plaster immobilization was used in two of the nine cases. One patient had lymphatic leukæmia and died without showing improvement with penicillin though the organism was susceptible *in vitro*.

Of seven acute postoperative infections, all treated with penicillin, five wounds were reopened for drainage. In one case *E. coli* and *B. pyocyaneus* were the contaminants and were not affected by penicillin. Another case, infected by a penicillin resistant staphylococcus which did not respond to intramuscular penicillin, was cleared up by local penicillin instillations. Post traumatic bone infection showed similar responses to intramuscular and local administration. A case of non-union of the mandible with osteomyelitis was successfully operated upon and grafted with the use of penicillin. One patient with osteomyelitis of the jaw was admitted in coma with anasarca died in three days in spite of penicillin.

Chronic bone infections were also found to respond to penicillin therapy when the organism was sensitive. Sinuses closed, and operations to remove sequestra, infected bone, granulation tissue, and chronic abscesses were successful after a preoperative course of penicillin. Two cases in which sinuses closed without operation had a recurrence of infection a year later. Infected fractures were all operated upon and infected tissue removed after preoperative penicillin which was continued. Half of the 18 wounds closed at operation, healed per primam and three broke down completely. Bony union occurred in 13 of the 18, one had fibrous union and four had persisting non-union.

Three patients with tuberculosis with secondary infection of bones and joints were treated with penicillin. Two had secondary infection with a sensitive staphylococcus and were only temporarily improved. One patient was given 6,750,000 units of penicillin before and after an extensive operation, removing infected tissue and arthrodesing the knee with cancellous grafts. His wound healed per primam and still appeared cured a year later.

It is recommended that penicillin be given both before and after operation on infected bone, that tubes

for penicillin instillation be removed by the 14th day, and that invasion by penicillin resistant organisms be guarded against in every possible way. In chronic cases all infected material must be removed in order to cure the patient. BURNS PLEWES

Interphalangeal Joints—A Method of Digital Skeletal Traction which Permits Active Motion. Quigley, T. B. and Wrist, M. R.: *Am. J. Surg.*, **73:** 175, 1947.

The recovery of hand motion and usefulness after fracture is less perfect the longer and more complete the immobilization. A method of traction which does not cause pain, ischæmia, a tender pulp scar, injury to tendons or neurovascular bundle is described. The middle of the dorsum of the middle phalanx is subcutaneous and is therefore drilled for the insertion of a hook made from a Kirschner wire. Traction is applied by means of this hook which is fastened to a "banjo splint" held in position by a forearm plaster. Manipulation is usually necessary to perfect reduction. As recommended by Bunnell the finger is held in flexion and no longer than three weeks. BURNS PLEWES

Some Observations on Penetrating Wounds of the Heart. Hillsman, J. A. B.: *Am. J. Surg.*, **73:** 305, 1947.

Wounds of the heart are rare and usually fatal in civilian practice, but stab wounds with small pericardial incisions may result in hæmopericardium, squeezing the heart into immobility. A large hole in the pericardium and a small one in the heart muscle, such as is seen in some wounds from shrapnel does not result in tamponade.

The author describes four cases seen in a field surgical unit. Bleeding occurs only in systole and consists of surprisingly small spurts of blood even when the wound is one-third of an inch in diameter, in either auricle or ventricle. Clinical signs, except the site of the wound, were absent. There was profound shock, dyspnœa, and hæmothorax.

When the exploring finger showed a hole in the pericardium, a trapdoor incision was made through the third, fourth and fifth ribs under pressure anæsthesia. The wound of the heart muscle was sutured and pericardium left open. A flap of pectoralis major was brought down to make the closure of the thorax airtight.

Of the four cases, two recovered. Wounds of the left main bronchus in one case, and myocardial infarction (the left coronary artery had been wounded) in another were the causes of death in the other two.

BURNS PLEWES

Obstetrics and Gynæcology

Leucoplakia Vulvæ. Hyams, M. N. and Bloom, O. H.: *Am. J. Obst. & Gyn.*, **53:** 214, 1947.

Leucoplakia vulvæ is of metabolic origin, due to a failure in utilization and/or absorption of vitamin A. Uncomplicated cases of minimal leucoplakia can be relieved with adequate doses of vitamin A and dilute hydrochloric acid. In four years of observation, not one case showed a tendency toward vulvar carcinoma. For this reason leucoplakia is not considered to be a neoplastic disease. Comparative microphotographs before and after treatment, show the improvement and tendency toward the normal histologic architecture in treated cases. ROSS MITCHELL

Retrodisplaced Gravid Uterus. Barnes, H. H. F.: *Brit. M. J.*, **1:** 169, 1947.

A series of 66 patients with a retrodisplaced gravid uterus, who were admitted to the wards is analyzed. A plea is made for conservative treatment of the sterile woman with a retrodisplaced uterus. It is suggested that operative correction of a retrodisplaced uterus for a previous abortion is unwarranted.

Incarceration may occur between the 13th and 17th weeks of pregnancy, and two cases of sacculation of the incarcerated gravid uterus are briefly described. The cardinal symptom of incarceration is sudden onset of retention of urine with lower abdominal pain. Treatment of the condition, which is primarily instituted to avoid incarceration is outlined. ROSS MITCHELL

Surgery in the Uterine Fibroid, a Plea for Myomectomy. Ross, J. W.: *Am. J. Obst. & Gyn.*, **53:** 266, 1947.

The uterine fibroid is a benign neoplasm, and its mere presence should be no cause for surgery. Only incontrovertible reasons, such as hæmorrhage, pain, pressure symptoms, signs of tumour degeneration, rapid growth, interference with the pregnant states, cosmetic and marital purposes should indicate surgical intervention.

Myomectomy, even multiple, whereby endocrine balance, menstruation and reproductive possibility are preserved, should be preferable to hysterectomy.

The preoperative, operative and postoperative preparation, technique and care, respectively, as herein outlined, have enabled the author to perform successfully 900 consecutive myomectomies for the interstitial and submucous types of fibroids with complete control and prevention of infection. The objections by opponents of myomectomy such as hæmorrhage, infection, adhesions and tumour recurrence have been effectively overcome in the procedures outlined.

This paper is presented with the hope that the widespread use of myomectomy as described, will merit its recognition as the procedure of choice in the surgical treatment of uterine fibroids. ROSS MITCHELL

Dermatology

Benadryl in Dermatologic Therapy. Lynch, F. W.: *Arch. Dermat. & Syph.*, **55:** 101, 1947.

The author, working in the Division of Dermatology, University of Minnesota, reports on the administration of benadryl in 90 patients: 33 had urticaria and the remainder had a variety of dermatologic manifestations; 10 of the urticaria cases were acute and there was recovery in 9 of them, but it was admitted that equally good results might have been obtained by rest, simple topical remedies and sedation. The 23 patients with chronic urticaria were divided into two groups: those whose eruption had been present from 1 to 7 months, and those who had suffered for 1 year or more. Of the first group of 10 cases 8 were completely relieved. In the second group 11 of 13 received satisfactory relief. One of the latter was a patient of 54 who had suffered from urticaria since childhood, but received 90% relief in one month. The therapeutic efficiency of benadryl in chronic urticaria was indicated by relapse when the medication was discontinued during the course of improvement, with continuation of relief when the drug was resumed. In 3 cases of urticarial drug reactions relief was rapid. Moderate relief was obtained in pruritus vulvæ and erythema multiforme and further trial is indicated in such cases.

Although it is recognized that while the action of the drug is palliative only, cumulative toxic effects were not observed by the original investigators at the University of Michigan when the drug was taken for as long as seven months.

In most cases of Lynch's series the initial oral dosage was 50 mgm. 6 times daily. In no case was the dose of 400 mgm. per day exceeded, and in all cases the dosage was reduced as rapidly as relief was obtained, usually remaining at 50 mgm. to 150 mgm. daily for a prolonged period in cases of chronic urticaria. D. E. H. CLEVELAND

Penicillin Therapy in Pyogenic Dermatoses. Hopkins, J. G. and Lawrence, H.: *Am. J. Med. Sc.*, **212:** 674, 1946.

The authors report on 618 soldiers. The results were best in impetigo and ecthyma, in which equally good effects were produced by topical or by parenteral administration. The frequency of relapse in impetigo was notable and ascribed to premature cessation of treatment. Continuation of treatment of neighbouring as well as

involved areas after apparent cure is held to be necessary. The authors share the experience reported by many others in finding folliculitis of the beard very resistant, although in those forms caused by sensitive cocci penicillin was effective if used in sufficient concentration. In general the response to treatment in the various pyogenic dermatoses, including diseases in which pyogenic infection played a secondary rôle only, as acne, was good in direct proportion to the predominance of penicillin-sensitive strains. A curious exception was noted in ecthyma and secondarily infected dermatophytosis in which the percentage of resistant strains was high. Allergic sensitivity occurs with more than twice the frequency (25%) in eczematous dermatitis than in other forms, which observation has been paralleled by observations in allergic reactions to topically employed sulfonamides. While sensitization was more frequent with the higher concentrations in ointments, it appeared that a concentration of 10,000 units per gram was advantageous, while 100 units per gram concentration was much less effective. Intramuscular injection of oil-beeswax suspensions in doses of 300,000 units once or twice daily was effective in impetigo and ecthyma, topical treatment was equally effective, and parenteral therapy is hence considered unnecessary. Some cases of folliculitis of the beard which failed to respond to topical therapy were cured by intramuscular injection, and in lymphangitis and cellulitis parenteral therapy was decidedly more effective. Oral therapy, given every 2 hours for 9 doses totalling 550,000 to 1,100,000 units daily appeared to have advantages in some circumstances, as in the prolonged follow-up of furunculosis, folliculitis and hidrosadenitis after intramuscular therapy, and is less likely to produce sensitization in eczematous dermatitis. D. E. H. CLEVELAND

Development and Use of BAL. A Review, with Particular Reference to Arsenical Dermatitis. Sulzberger, M. B. and Baer, R.: *J. Am. M. Ass.*, **133:** 293, 1947.

The authors trace the history of the development of the views put forth in 1909 by Ehrlich that the toxic action of arsenic is due to its combination with the thiol or sulfhydryl groups of tissue enzymes, thus inactivating substances essential to life and function. From this developed the concept that this combination might be loosed by administration of synthetic thiol groups having a greater affinity for arsenic. The group of English scientists, R. A. Peters and his collaborators, showed that of these groups the dithiols were the more effective, and developed dimercaptol (BAL—British Anti-Lewisite) as a decontaminator and neutralizing agent against the arsenical vesicant gas lewisite. In experimental animals and in humans this was found effective when used on the skin. It was also found that BAL was still more effective when used parenterally against systemic poisoning by arsenical compounds. Its therapeutic value found employment against the dermatitis produced by antisyphilitic arsenic compounds. In Eagle's series of 88 cases treated 80% responded to the treatment. In toxic encephalitis, agranulocytosis, massive over-dosage by oxophenarsine hydrochloride (mapharsen), and "arsenical fever", the number of satisfactory responses was high. There was no response in 3 cases of aplastic anæmia, and only 5 of 14 cases of jaundice showed good results.

BAL is administered in a peanut-oil solution with benzyl benzoate. The dose recommended in severe cases is 3 mgm. per kg. in each intramuscular injection (1.8 c.c. of a 10% solution of BAL for a 60 kg. patient.) For the first two days 6 such injections are given daily at 4-hour intervals; 2 injections are given on the third day and 1 or 2 daily for 10 days or until recovery. In milder cases the dose is 2.5 mgm. per kg. per injection, only 4 injections at 4-hour intervals being given on each of the first 2 days with the same frequency as given above for the succeeding days. Side effects may appear after the 4th injection of the higher dosage, and their incidence increases rapidly if the dose is raised to 4 or 5 mgm. per kg. They are of temporary nature, reaching their maximum 15 to 20 minutes after the injection. They include nausea, vomiting, headache, burning sensations in mouth, lips, throat and eyes, pain in teeth, lachrymation and salivation, elevation of systolic and diastolic blood-pressure with anginal pain in chest and throat. Cutaneous allergic sensitization to BAL can occur and the substance is a whealing agent when applied to the skin. D. E. H. CLEVELAND

Use of 5-Nitro-2-Furaldehyde Semicarbazone in Dermatology. Downing, J. G., Hanson, M. C. and Lamb, M.: *J. Am. M. Ass.*, **133:** 299, 1947.

This substance, better known as furacin, has been found to be nonirritating and nontoxic on local application, and to exhibit no adverse effect on the healing of experimental wounds. Its anti-bacterial activity extends to a variety of Gram-positive and Gram-negative bacteria. It exerts this effect in the presence of blood and serum. It is used in 1/500 solution in a water-soluble vehicle (furacin soluble dressing) containing carbowax 1,500 and propylene glycol. The dressing and the soluble base were tested for irritant properties on 200 normal persons, by patch-test, and for sensitizing properties on 50 of these subjects 10 days later. Reactions did not reach greater intensity than erythema, and occurred in less than 10% of subjects tested. Photosensitization did not occur, and while some discoloration of the compound occurred after exposure to sunlight, there was no staining of the skin.

Clinical tests were made in 212 cases. These were grouped as follows: (1) Infectious eczematoid dermatitis, impetigo and ecthyma, and sycosis vulgaris; (2) Dermatophytosis with secondary infection; (3) Dermatitis venenata with secondary infection; (4) Ulcers—traumatic, postoperative and decubitus; (5) Hypostatic (varicose) ulcers; (6) Acne and diabetic ulcers; (7) a heterogeneous group treated either for control of secondary infection, or as in pemphigus to ascertain the effectiveness of the compound. There was reduction of the bacterial flora in 81.4% of the strains of bacteria isolated, in periods varying from 24 hours to 17 days. This is not to be taken as the sole criterion of therapeutic effectiveness; in fact there appeared to be little relationship between the reduction of bacterial flora and clinical results, except that in the cases in which the flora was not reduced clinical improvement did not occur and this group is considered as resistant. It is worth noting that after the original tests were made for sensitization effect a new lot of material was received from the manufacturers, from which a number of cases of severe sensitization occurred. This was suspected to be due to some change in the base. It is also to be observed that testing for irritant and sensitizing properties on normal skins is not the same thing as application of such new therapeutic agents to damaged skin, where unanticipated reactions may occur. While good results were obtained in the treatment of superficial infections of the skin, they do not appear to be superior or more frequently obtained than by other commonly used agents. Occasional brilliant results were observed in conditions which were refractory to or intolerant of other agents, and in such situations it should be tried. D. E. H. CLEVELAND

Ringworm of the Scalp. Report of the Present Epidemic. Steves, R. J. and Lynch, F. W.: *J. Am. M. Ass.*, **133:** 306, 1947.

Ringworm of the scalp is now pandemic in the United States. Epidemics have appeared in 61 cities having populations of over 40,000. It is to be noted from the accompanying map that all of these cities but 14 are situated in the northeastern states—east of the Mississippi and north of the 37th parallel. By "epidemic ringworm of the scalp" is meant that form caused by *M. audouini.* This organism is pathogenic principally for human beings as contrasted to *M. lanosum,* believed to be responsible for most cases of ringworm, widespread though sporadic, seen in U.S.A. before 1940. The latter type is generally spread by cats and dogs and does not

produce extensive epidemics. The epidemic form produced by *M. audouini* is highly contagious, being transmitted from person to person by infected hairs, and resistant to topical therapy, although it disappears spontaneously at puberty. The Wood lamp is indispensable for early detection of cases but does not differentiate between the two types of infection; for this cultural study is essential. In the study of the recent epidemic in St. Paul and Minneapolis the authors noted that the occiput was the usual site of initial involvement. The authors agree with the observation made in other cities that theatre seats are an important factor in the development of epidemics. They consider that schools and barbershops do not play as conspicuous a rôle as commonly believed. None of their cases could with certainty be traced to a barbershop and none of the girls infected patronized barbershops. There is evidence that theatre seats may be grossly contaminated with infected hairs; 97% of infected children questioned attended theatres and of this group 78% admitted attending theatres after they knew they had ringworm.

The public health aspects of the pandemic are emphasized. Any gray scaling patch containing broken hairs should be suspected and an exact diagnosis should be obtained by means of a Wood lamp and the culture-tube. In the *M. audouini* infection roentgen epilation is far superior in rapidity and efficacy to other therapeutic measures as yet available, and should be employed routinely. D. E. H. CLEVELAND

Histamine Antagonists. IV. Pyridil-N'-Benzyl-N-Dimethylethylenediamine (Pyribenzamine) in Symptomatic Treatment of Allergic Manifestations. Feinberg, S. M. and Friedlaender, S.: *Am. J. Med. Sc.*, **213:** 58, 1947.

It is believed that some allergic manifestations may be due to a histamine release similar to that which forms part at least of the mechanism of anaphylactic shock. The attempt to alleviate symptoms due to histamine intoxication by the use of histamine has been a failure, mainly because of the impossibility of duplicating *in vitro* the prolonged incubation and close contact of histaminase and histamine required for destruction of the latter. There has been much effort exerted to develop synthetic substances which might have antianaphylactic and antiallergic action. Most of the substances tried have been either insufficiently active or too toxic. Among those most recently developed has been pyribenzamine. This substance has a high efficiency in producing the desired effects. No serious toxic effects have been so far observed in any case in which the drug was used over a period of weeks, but it is too early to pronounce upon the question of chronic toxicity. Side effects were not of sufficient severity to demand discontinuance. The most commonly observed resulted from sedation or cerebral stimulation and occurred in about 25% of over 300 persons receiving the drug.

The drug was administered orally in 50 mgm. tablets, preferably not on an empty stomach. In most cases 4 doses were given daily. The dose of 100 mgm. 4 times daily was the largest given and occasionally a bed-time dose only was required in patients whose symptoms were chiefly nocturnal. The medication was given with a large degree of success in 14 different conditions. In a small number each of allergic reactions to penicillin, sulfonamides and barbiturates improvement resulted in every case. In acute and chronic urticaria and in atopic dermatitis the percentage of patients obtaining relief was high. It is to be remembered that this and similar drugs are palliative only and do not cure the allergic condition. D. E. H. CLEVELAND

Pathology

Granular Cell Myoblastoma. Powell, E. B.: *Arch. Path.*, **42:** 517, 1946.

The author reviews the literature concerning the incidence, distribution and characteristic microscopic appearance of granular cell myoblastoma. Their resemblance to endocrine tumours is noted and the fact that the characteristic granules have not been identified. The uncertainty of origin of these tumours is emphasized and reference made to Klinge's dysontogenetic theory and other opinions. Although the majority are non-encapsulated and infiltrating, they are considered benign, but in the presence of certain criteria, they should be treated as malignant.

Four cases of histologically typical granular cell myoblastoma are reported. Two of these presented painless lumps in the skin which did not recur following excision. The third was a locally destructive tumour of the tongue in a fourteen-year old negro boy, which led to death through erosion of a large vessel. In this case, no transition from myoblastoma cells to striated muscle was evident, but there was a striking organoid or pseudoalveolar arrangement of the myoblastoma cells. The fourth case was that of a 26-year old negro woman with multiple skin nodules of at least 10 years' duration and large ovarian and retroperitoneal masses which had produced lower abdominal and pelvic pain. The skin nodules and abdominal masses were removed surgically and all presented the typical histological appearance of myoblastoma. In this case the author concluded that in spite of the larger size of the ovarian and retroperitoneal tumours, the known long duration of one axillary skin nodule made it a more probable primary lesion.

R. C. Ross

Medial Calcification of Arteries of Infants. Field, M. H.: *Arch. Path.*, **42:** 607, 1946.

In the light of the senescence theory of arteriosclerosis, its occurrence in infants, although rare, is of interest. A case of extensive medial arterial calcification in a 10-week old infant is presented.

This female infant was born without complications and the first few weeks of life were uneventful. In the sixth week a physician was consulted who recommended oleum percomorph, 5 drops daily. Anorexia, apparent weight loss and listlessness developed, and on admission to hospital the child was cyanotic, undernourished and dehydrated. In spite of oxygen and intravenous dextrose, death occurred in three hours. At autopsy the right ventricle was dilated and the myocardium soft with focal fibrosis. The coronary arteries and branches showed extensive medial calcification and subendothelial fibrous intimal proliferation. Similar lesions were present in the arteries of the larynx, thyroid, mesentery, pancreas, adrenals, kidneys and spleen. The aorta, pulmonary and cerebral arteries were not involved. The parathyroids were normal.

The 14 cases of arteriosclerosis in infants reported in the literature are reviewed. The lesions described consist of calcium deposition in the inner and middle third of the media in intimate relation to the internal elastic lamina, with associated fibroblastic intimal proliferation without degenerative changes. The medium sized arteries are involved frequently, the pulmonary and aorta in the very young, but involvement of the cerebrals has not been reported. It is noted that infection preceded death in 5 cases. In considering etiology reference is made to Iff's theory of incomplete development of the "ground substance" of arteries. The possible rôle of disturbances in calcium metabolism, hypervitaminosis D or parathyroid overactivity are considered with reference to experimental production of arteriosclerosis. The author did not feel that the cause of the arterial changes in the case presented was determined, but she concluded that specific changes in the ground substance are probably responsible for the ensuing calcification in these cases. R. C. Ross

Organized Emboli of the Tertiary Pulmonary Arteries. Castleman, B. and Bland, E. F.: *Arch. Path.*, **42:** 581, 1946.

A case of cor pulmonale due to organized emboli of the tertiary pulmonary arteries is presented. A 44-year old female developed cyanosis shortly after her third pregnancy and one year later began to have intermittent,

sharp epigastric and substernal pain. Dyspnœa on effort developed and she was hospitalized. Hypertrophy of the right ventricle and delayed circulation rates suggesing obstruction proximal to the lungs were found. In the next seven years progressive right ventricular failure developed but the lungs remained clear. At autopsy there was marked hypertrophy and dilatation of the right auricle and ventricle. Almost all tertiary branches of the pulmonary arteries were occluded by lattice-like fibrous trabeculæ which resisted a considerable pressure of water. Proximally the arteries were thickened and atheromatous, while distally they were normal. Microscopically the meshworks appeared to be organized and recanalized thrombi. Several fibrous pleural plaques, characteristic of healed infarcts, were found.

Advanced pulmonary arteriosclerosis, anomalous development and organized recanalized thrombi are considered as possible explanations. But the authors conclude that the lesions were due to organized, recanalized emboli, probably from the veins of the pelvis or lower leg, some of which had produced infarcts. The inadequate recanalization led to pulmonary hypertension, arteriosclerosis proximal to the obstruction and cor pulmonale. (Although the authors appear to regard this as an original interpretation, Belt—*The Lancet*, p. 730, September 30, 1939—has described four similar cases and reached similar conclusions as to the pathogenesis of the pulmonary obstruction.—*Abstracter.*) R. C. ROSS

Pathological Changes Resulting from the Administration of Streptomycin. Mushett, C. W. and Martland, H. S.: *Arch. Path.*, **42:** 619, 1946.

The authors report pathologic changes produced in laboratory animals by streptomycin administered for brief and for prolonged periods. Parenteral administration of highly purified and average streptomycin resulted in reversible fatty metamorphosis of the liver and less frequently the kidney, in monkeys and dogs. Focal necrosis was seen infrequently in these organs. In some monkeys albuminous detritus appeared in the subcapsular space and tubules of the kidney, and in dogs receiving streptomycin for several weeks casts, epithelial cells and leukocytes appeared in the urine. Disturbances of equilibrium, gait and possible hearing were noted in dogs following prolonged administration of streptomycin concentrates of average purity. No lesions of the central nervous system were found, but further study of the vestibular and auditory apparatus is in progress. The only significant blood change observed was a transient normocytic anæmia. Local irritative effects were more severe with less purified streptomycin. In man evidence of pathologic damage is lacking but neurotoxic symptoms attributed to involvement of the eighth nerve have been described. The authors conclude that since the local damage and histamine-like action can be ascribed to impurities, the possibility remains that impurities are responsible for the other toxic effects observed. R. C. ROSS

Industrial Medicine

Fluorine Hazards with Special Reference to Some Social Consequences of Industrial Processes. Murray, M. M. and Wilson, D. C.: *The Lancet*, **2:** 821, 1946.

The desirability of an invesigation to ascertain the nature and location of all industrial processes creating a possible fluorine hazard and the need of collaboration between Government departments, industries, local authorities and research workers, are stressed by the authors of this article. After referring to the source of fluorine in nature, to its rôle in nutrition, and to the effects of fluorine poisoning, they discuss briefly examples of both acute and chronic fluorosis which have been recognized in Great Britain and which have been described in the literature. They differentiate between naturally occurring or endemic fluorosis attributable to water-supplies, and "man-made" fluorosis, due to industrial processes.

To show the dangers to public health and to agricultural economy they present details of a study conducted in south Lincolnshire where ironstone workings lie in an agricultural district of low hills and wide valleys. The ore is mixed, in the field where it is mined, with coal cobbles and slack and "burnt"; the resulting cloud of smoke containing fluorine compounds drifts over the countryside causing deterioration in the growth of field crops. The study centered around the home of Farmer X, a poorly constructed house in the middle of fields. The family were exposed continuously to the fumes. Effects on the food in the larder, on the farm animals, and on the window glass are outlined; a table summarizes the medical findings in the cases of Farmer X and members of his family.

In contrast to the poor health experienced by these persons was that of members of a farm household adjacent to ironstone pits from which the ore was sent direct to blast furnaces without local calcining. There was no evidence of illness in either the persons or their farm stock. Neither was there any history of clinical disability attributed to fluorine, obtained from the workmen employed for over 15 years at the blast furnaces dealing with the ore.

The authors suggest that the substitution of closed kilns in the burning of ironstone in the south Lincolnshire area studied, would make the amount of fluorine present in ore and in the coal, immaterial from the public health point of view. MARGARET H. WILTON

Rehabilitation of the Tuberculous in Industry. Kiefer, N. C. and Hilleboe, H. E.: *J. Am. M. Ass.*, **132:** 121, 1946.

The program of the Tuberculosis Control Division of the United States Public Health Service, created in July, 1944, embodies four major phases: case-finding and diagnosis, adequate medical care, rehabilitation and after-care, and protection of the patient and his family against economic distress. Technical developments in diagnostic procedures have, during the twentieth century, brought roentgenograms of the chest within the reach of the majority of the population, with the result that pulmonary tuberculosis is being diagnosed at an earlier stage of the disease. The importance of this in industry is being recognized and acknowledged to an increasing extent, by both management and labour. They are in a position to facilitate the maintenance of medical care and hospitalization.

In the opinion of the authors, adequate diagnostic facilities and proper medical treatment, although of great importance, will not realize effective results without rehabilitation, which has been interpreted as "the restoration of tuberculous persons to the fullest physical, mental, social, vocational and economic usefulness of which they are capable". Many tuberculous ex-patients have proved satisfactory employees and it is felt that in order that the great majority may obtain profitable work, the intelligent co-operation of management, labour, employees' liability insurance companies and workmen's compensation boards is needed. Suitable work placement in accordance with physical limitations must be part of the employment program. Homebound employment should be reserved for only those patients who are so incapacitated as to be unable to resume even partially a normal rôle in the working world. In connection with patients who persistently raise sputum which contains tubercle bacilli, it is suggested that separate departments in industry be established for them, where they will work with fellow employees similarly afflicted.
MARGARET H. WILTON

ST. GEORGE'S HOSPITAL. — St. George's Hospital is to move from its present site at Hyde Park Corner to the Springfield Estate at Wandsworth. The new building will house 1,000 beds. St. George's was founded in 1733 in Lanesborough House on fields overlooking Hyde Park, and was rebuilt on its present site at the "centre of London" just over 100 years ago.

OBITUARIES

Dr. Colin A. Campbell, died at the age of 31 in the Memorial Hospital, St. Thomas, Ontario, March 15. He had suffered a long illness contracted overseas while serving as regimental medical officer of the Carleton and York Regiment in Sicily in the summer of 1943.

He attended Wellington Street School and the Collegiate Institute where he and his two brothers were all leaders in athletics, particularly rugby. In their final years, Colin and Archie Campbell paired as backfield stars with the senior football teams.

Colin entered Queen's University at 15 to follow in his father's footsteps in the study of medicine. At Queen's he distinguished himself as the youngest graduate in his class of '38 and standing near the top. He played football at Queen's with interfaculty teams, though not with the intercollegiate teams. He spent one summer while attending university as an intern at the Memorial Hospital, St. Thomas, and was permitted, because of his high academic standing, to intern at Kingston General Hospital while completing his final year at University.

On graduation, he interned through 1938-39 at Victoria Hospital, London, Ont., and then took a year's postgraduate work in surgery at University Hospital, University of Minnesota, Minneapolis.

A member of Knox Presbyterian Church since childhood, Dr. Campbell was also a member of the St. Thomas Kiwanis Club.

Surviving are his widow and two sons.

Dr Paul Côte, chirurgien, citoyen très estimé de Victoriaville, Qué., est décédé le 3 mars au matin, à l'âge de 30 ans. A trois reprises il s'était levé dans la nuit du 2 au 3 mars, pour répondre à l'appel aux malades. A sa dernière entrée chez lui, vers 3 heures et demi, du matin, il a dû s'endormir dans son auto, épuisé de fatigue et jusqu'ici on prétend qu'il s'est asphyxié. On le trouva mort à l'arrière de son auto dans son garage à 6 h. et 30. Le Dr Paul Côté avait fait ses études à l'université Laval à Québec et s'était spécialisé dans la chirurgie.

Son épouse, sa mère, trois frères et une sœur lui survivent.

Le Dr J.-F. Delisle, est décédé le 9 mars à l'Hotel Dieu, Montréal, à l'âge de 67 ans, après une courte maladie. Il avait pratiqué la médecine à Montréal et Chicoutimi depuis 1906 et avait été hygiéniste pour la ville de Chicoutimi de 1918 à 1921. Il avait aussi été à l'emploi du ministère provincial de la santé, pour le district sanitaire de Hull, durant 22 ans, et était à sa retaite depuis deux ans.

Outre son épouse, il laisse un fils.

Dr. William Andrew DeWolf-Smith died February 21 in Melrose Nursing Home, New Westminster, B.C. He was in his 86th year.

Dr. DeWolf-Smith was born in New Brunswick of an old English family and came to New Westminster in 1888. His practice extended throughout the Fraser Valley. He was among the first to give up his horse and buggy for an automobile.

He was one of the physicians who fought the smallpox plague among the Delta Indians and was one of the first medical health officers of New Westminster. For years he was attached to the B.C. Penitentiary. A talented musician and patron of the arts, he was manager of the old Opera House and President of the New Westminster Operatic Society. He was active in the New Westminster Tennis Club.

He had lived with his daughter, Mrs. Robert Smithwick, Sardis, for the last few years.

John Keith Munroe Fife. On March 21, 1947, Dr. Jack Fife died suddenly in Calgary of a coronary occlusion. He had been in Calgary as guest speaker at the Medical Meeting of the Staff of the Belcher Hospital. To his friends and associates the cutting short of his brilliant career is a great loss. It is difficult to portray Jack Fife to those who did not know him. His unerring ability to see the essential point in any medical discussion and to add to it was well known.

Jack was born in Peterborough, in 1898, the fourth son of James Alexander Fife and Harriet Wright (Fife). He came west with his family in 1906. He obtained his public and high school education in Edmonton, matriculated at the age of fifteen, then attended Normal School and later taught school at Sandy Lake. In 1915 he went North on the first Geological Survey, travelling across the Great Slave Lake by canoe and going north to Hay River; an experience of which he was proud. He registered in Arts at the University of Alberta in 1916 completing his first year. He then joined the 78th Battery in the spring of 1917. Before he was nineteen he had risen to the rank of Sergeant. On going Overseas he was transferred to the 18th Battery serving in France and in the Army of occupation in Germany. On his return he entered Medicine at the University of Alberta and there completed his first three years. In the fall of 1922 he went to McGill, graduating in 1924 and obtaining honours in Surgery. A first class, all round athlete, he excelled at football, playing outside wing of the first teams of both Alberta and McGill.

On graduation he secured an internship at the Montreal General Hospital and the next year went to the Lahey Clinic in Boston where he remained for three years. Coming under the influence of Dr. Frank Howard Lahey he became particularly interested in Thyroid Surgery. On completion of his Fellowship at Lahey's he practiced for two years in Buffalo and then, on the invitation of Dr. A. R. Munroe, came to Edmonton to accept a position on the teaching staff of the University of Alberta and to practice with Dr. Munroe. He quickly demonstrated his ability and gained a wide reputation as a surgeon, particularly in surgery of the thyroid gland, being leader in this field. At the Medical School he was one of the outstanding clinical instructors and his clinics were much appreciated by the undergraduates. He held many positions of responsibility, among them, that of surgeon to the Department of Pensions and National Health and consultant surgeon to the Cancer Clinic. At the time of his death he was Assistant Professor of Clinical Surgery at the University of Alberta.

In the death of Jack Fife we have lost a stimulating confrère, a cheerful companion and a very great friend. He met each day with optimism and cheerfulness. None of us who knew him can recall his ever complaining. Those of us who were his friends will never forget him. His family was a particularly happy one. In 1934 he married Dorothy Archibald, daughter of the late Dr. Seymour Archibald and Mrs. Archibald of Edmonton. He is survived by his widow and two daughters, Susan, eleven and Brenda, eight.

R. G. HUCKELL

Dr. Lowell Shields Foster, prominent Westmount physician, died suddenly at his residence on March 1.

Dr. Foster was born in New Brunswick. He graduated in medicine at McGill University in 1911 and for a short period was resident physician at the Royal Victoria Hospital. Later he took postgraduate courses at Heidelburg and Hamburg in Germany and at London, England.

He served as a medical officer in the First Great War with the 73rd Battalion and later returned to Montreal to resume his practice.

Surviving are his widow, two daughters, two brothers and six sisters.

sharp epigastric and substernal pain. Dyspnœa on effort developed and she was hospitalized. Hypertrophy of the right ventricle and delayed circulation rates suggesing obstruction proximal to the lungs were found. In the next seven years progressive right ventricular failure developed but the lungs remained clear. At autopsy there was marked hypertrophy and dilatation of the right auricle and ventricle. Almost all tertiary branches of the pulmonary arteries were occluded by lattice-like fibrous trabeculæ which resisted a considerable pressure of water. Proximally the arteries were thickened and atheromatous, while distally they were normal. Microscopically the meshworks appeared to be organized and recanalized thrombi. Several fibrous pleural plaques, characteristic of healed infarcts, were found.

Advanced pulmonary arteriosclerosis, anomalous development and organized recanalized thrombi are considered as possible explanations. But the authors conclude that the lesions were due to organized, recanalized emboli, probably from the veins of the pelvis or lower leg, some of which had produced infarcts. The inadequate recanalization led to pulmonary hypertension, arteriosclerosis proximal to the obstruction and cor pulmonale. (Although the authors appear to regard this as an original interpretation, Belt—*The Lancet*, p. 730, September 30, 1939—has described four similar cases and reached similar conclusions as to the pathogenesis of the pulmonary obstruction.—*Abstracter.*) R. C. ROSS

Pathological Changes Resulting from the Administration of Streptomycin. Mushett, C. W. and Martland, H. S.: *Arch. Path.*, **42:** 619, 1946.

The authors report pathologic changes produced in laboratory animals by streptomycin administered for brief and for prolonged periods. Parenteral administration of highly purified and average streptomycin resulted in reversible fatty metamorphosis of the liver and less frequently the kidney, in monkeys and dogs. Focal necrosis was seen infrequently in these organs. In some monkeys albuminous detritus appeared in the subcapsular space and tubules of the kidney, and in dogs receiving streptomycin for several weeks casts, epithelial cells and leukocytes appeared in the urine. Disturbances of equilibrium, gait and possible hearing were noted in dogs following prolonged administration of streptomycin concentrates of average purity. No lesions of the central nervous system were found, but further study of the vestibular and auditory apparatus is in progress. The only significant blood change observed was a transient normocytic anæmia. Local irritative effects were more severe with less purified streptomycin. In man evidence of pathologic damage is lacking but neurotoxic symptoms attributed to involvement of the eighth nerve have been described. The authors conclude that since the local damage and histamine-like action can be ascribed to impurities, the possibility remains that impurities are responsible for the other toxic effects observed. R. C. ROSS

Industrial Medicine

Fluorine Hazards with Special Reference to Some Social Consequences of Industrial Processes. Murray, M. M. and Wilson, D. C.: *The Lancet*, **2:** 821, 1946.

The desirability of an invesigation to ascertain the nature and location of all industrial processes creating a possible fluorine hazard and the need of collaboration between Government departments, industries, local authorities and research workers, are stressed by the authors of this article. After referring to the source of fluorine in nature, to its rôle in nutrition, and to the effects of fluorine poisoning, they discuss briefly examples of both acute and chronic fluorosis which have been recognized in Great Britain and which have been described in the literature. They differentiate between naturally occurring or endemic fluorosis attributable to water-supplies, and "man-made" fluorosis, due to industrial processes.

To show the dangers to public health and to agricultural economy they present details of a study conducted in south Lincolnshire where ironstone workings lie in an agricultural district of low hills and wide valleys. The ore is mixed, in the field where it is mined, with coal cobbles and slack and "burnt"; the resulting cloud of smoke containing fluorine compounds drifts over the countryside causing deterioration in the growth of field crops. The study centered around the home of Farmer X, a poorly constructed house in the middle of fields. The family were exposed continuously to the fumes. Effects on the food in the larder, on the farm animals, and on the window glass are outlined; a table summarizes the medical findings in the cases of Farmer X and members of his family.

In contrast to the poor health experienced by these persons was that of members of a farm household adjacent to ironstone pits from which the ore was sent direct to blast furnaces without local calcining. There was no evidence of illness in either the persons or their farm stock. Neither was there any history of clinical disability attributed to fluorine, obtained from the workmen employed for over 15 years at the blast furnaces dealing with the ore.

The authors suggest that the substitution of closed kilns in the burning of ironstone in the south Lincolnshire area studied, would make the amount of fluorine present in ore and in the coal, immaterial from the public health point of view. MARGARET H. WILTON

Rehabilitation of the Tuberculous in Industry. Kiefer, N. C. and Hilleboe, H. E.: *J. Am. M. Ass.*, **132:** 121, 1946.

The program of the Tuberculosis Control Division of the United States Public Health Service, created in July, 1944, embodies four major phases: case-finding and diagnosis, adequate medical care, rehabilitation and after-care, and protection of the patient and his family against economic distress. Technical developments in diagnostic procedures have, during the twentieth century, brought roentgenograms of the chest within the reach of the majority of the population, with the result that pulmonary tuberculosis is being diagnosed at an earlier stage of the disease. The importance of this in industry is being recognized and acknowledged to an increasing extent, by both management and labour. They are in a position to facilitate the maintenance of medical care and hospitalization.

In the opinion of the authors, adequate diagnostic facilities and proper medical treatment, although of great importance, will not realize effective results without rehabilitation, which has been interpreted as "the restoration of tuberculous persons to the fullest physical, mental, social, vocational and economic usefulness of which they are capable". Many tuberculous ex-patients have proved satisfactory employees and it is felt that in order that the great majority may obtain profitable work, the intelligent co-operation of management, labour, employees' liability insurance companies and workmen's compensation boards is needed. Suitable work placement in accordance with physical limitations must be part of the employment program. Homebound employment should be reserved for only those patients who are so incapacitated as to be unable to resume even partially a normal rôle in the working world. In connection with patients who persistently raise sputum which contains tubercle bacilli, it is suggested that separate departments in industry be established for them, where they will work with fellow employees similarly afflicted.
MARGARET H. WILTON

ST. GEORGE'S HOSPITAL. — St. George's Hospital is to move from its present site at Hyde Park Corner to the Springfield Estate at Wandsworth. The new building will house 1,000 beds. St. George's was founded in 1733 in Lanesborough House on fields overlooking Hyde Park, and was rebuilt on its present site at the "centre of London" just over 100 years ago.

OBITUARIES

Dr. Colin A. Campbell, died at the age of 31 in the Memorial Hospital, St. Thomas, Ontario, March 15. He had suffered a long illness contracted overseas while serving as regimental medical officer of the Carleton and York Regiment in Sicily in the summer of 1943.

He attended Wellington Street School and the Collegiate Institute where he and his two brothers were all leaders in athletics, particularly rugby. In their final years, Colin and Archie Campbell paired as backfield stars with the senior football teams.

Colin entered Queen's University at 15 to follow in his father's footsteps in the study of medicine. At Queen's he distinguished himself as the youngest graduate in his class of '38 and standing near the top. He played football at Queen's with interfaculty teams, though not with the intercollegiate teams. He spent one summer while attending university as an intern at the Memorial Hospital, St. Thomas, and was permitted, because of his high academic standing, to intern at Kingston General Hospital while completing his final year at University.

On graduation, he interned through 1938-39 at Victoria Hospital, London, Ont., and then took a year's postgraduate work in surgery at University Hospital, University of Minnesota, Minneapolis.

A member of Knox Presbyterian Church since childhood, Dr. Campbell was also a member of the St. Thomas Kiwanis Club.

Surviving are his widow and two sons.

Dr Paul Côte, chirurgien, citoyen très estimé de Victoriaville, Qué., est décédé le 3 mars au matin, à l'âge de 30 ans. A trois reprises il s'était levé dans la nuit du 2 au 3 mars, pour répondre à l'appel aux malades. A sa dernière entrée chez lui, vers 3 heures et demi, du matin, il a dû s'endormir dans son auto, épuisé de fatigue et jusqu'ici on prétend qu'il s'est asphyxié. On le trouva mort à l'arrière de son auto dans son garage à 6 h. et 30. Le Dr Paul Côté avait fait ses études à l'université Laval à Québec et s'était spécialisé dans la chirurgie.

Son épouse, sa mère, trois frères et une sœur lui survivent.

Le Dr J.-F. Delisle, est décédé le 9 mars à l'Hotel Dieu, Montréal, à l'âge de 67 ans, après une courte maladie. Il avait pratiqué la médecine à Montréal et Chicoutimi depuis 1906 et avait été hygiéniste pour la ville de Chicoutimi de 1918 à 1921. Il avait aussi été à l'emploi du ministère provincial de la santé, pour le district sanitaire de Hull, durant 22 ans, et était à sa retaite depuis deux ans.

Outre son épouse, il laisse un fils.

Dr. William Andrew DeWolf-Smith died February 21 in Melrose Nursing Home, New Westminster, B.C. He was in his 86th year.

Dr. DeWolf-Smith was born in New Brunswick of an old English family and came to New Westminster in 1888. His practice extended throughout the Fraser Valley. He was among the first to give up his horse and buggy for an automobile.

He was one of the physicians who fought the smallpox plague among the Delta Indians and was one of the first medical health officers of New Westminster. For years he was attached to the B.C. Penitentiary. A talented musician and patron of the arts, he was manager of the old Opera House and President of the New Westminster Operatic Society. He was active in the New Westminster Tennis Club.

He had lived with his daughter, Mrs. Robert Smithwick, Sardis, for the last few years.

John Keith Munroe Fife. On March 21, 1947, Dr. Jack Fife died suddenly in Calgary of a coronary occlusion. He had been in Calgary as guest speaker at the Medical Meeting of the Staff of the Belcher Hospital. To his friends and associates the cutting short of his brilliant career is a great loss. It is difficult to portray Jack Fife to those who did not know him. His unerring ability to see the essential point in any medical discussion and to add to it was well known.

Jack was born in Peterborough, in 1898, the fourth son of James Alexander Fife and Harriet Wright (Fife). He came west with his family in 1906. He obtained his public and high school education in Edmonton, matriculated at the age of fifteen, then attended Normal School and later taught school at Sandy Lake. In 1915 he went North on the first Geological Survey, travelling across the Great Slave Lake by canoe and going north to Hay River; an experience of which he was proud. He registered in Arts at the University of Alberta in 1916 completing his first year. He then joined the 78th Battery in the spring of 1917. Before he was nineteen he had risen to the rank of Sergeant. On going Overseas he was transferred to the 18th Battery serving in France and in the Army of occupation in Germany. On his return he entered Medicine at the University of Alberta and there completed his first three years. In the fall of 1922 he went to McGill, graduating in 1924 and obtaining honours in Surgery. A first class, all round athlete, he excelled at football, playing outside wing of the first teams of both Alberta and McGill.

On graduation he secured an internship at the Montreal General Hospital and the next year went to the Lahey Clinic in Boston where he remained for three years. Coming under the influence of Dr. Frank Howard Lahey he became particularly interested in Thyroid Surgery. On completion of his Fellowship at Lahey's he practiced for two years in Buffalo and then, on the invitation of Dr. A. R. Munroe, came to Edmonton to accept a position on the teaching staff of the University of Alberta and to practice with Dr. Munroe. He quickly demonstrated his ability and gained a wide reputation as a surgeon, particularly in surgery of the thyroid gland, being leader in this field. At the Medical School he was one of the outstanding clinical instructors and his clinics were much appreciated by the undergraduates. He held many positions of responsibility, among them, that of surgeon to the Department of Pensions and National Health and consultant surgeon to the Cancer Clinic. At the time of his death he was Assistant Professor of Clinical Surgery at the University of Alberta.

In the death of Jack Fife we have lost a stimulating confrère, a cheerful companion and a very great friend. He met each day with optimism and cheerfulness. None of us who knew him can recall his ever complaining. Those of us who were his friends will never forget him. His family was a particularly happy one. In 1934 he married Dorothy Archibald, daughter of the late Dr. Seymour Archibald and Mrs. Archibald of Edmonton. He is survived by his widow and two daughters, Susan, eleven and Brenda, eight.

R. G. HUCKELL

Dr. Lowell Shields Foster, prominent Westmount physician, died suddenly at his residence on March 1.

Dr. Foster was born in New Brunswick. He graduated in medicine at McGill University in 1911 and for a short period was resident physician at the Royal Victoria Hospital. Later he took postgraduate courses at Heidelburg and Hamburg in Germany and at London, England.

He served as a medical officer in the First Great War with the 73rd Battalion and later returned to Montreal to resume his practice.

Surviving are his widow, two daughters, two brothers and six sisters.

Dr F.-A. Gadbois, 71, de Sherbrooke, Que., est mort le 24 fevrier à Sanford, Floride.

Le Dr Gadbois, après ses études secondaires au Séminaire St-Charles Borromée de Sherbrooke, alla étudier la médecine à l'Université McGill, à Montréal, et il fut reçu médecin fort jeune, soit à l'âge de 20 ans seulement et il dut même attendre six mois, ses études terminées, avant de commencer à pratiquer sa profession, vu que la loi demande qu'un médecin ne puisse commencer à pratiquer avant l'âge de 21 ans.

Au cours de sa carrière, le Dr Gadbois, qui fut durant de longues années anesthésiste en chef à l'hôpital St-Vincent-de-Paul, alla étudier à Paris à deux reprises pour se spécialiser en pédiatrie.

En plus d'être un médecin éminent, le Dr Gadbois était un musicien remarquable et il possédait l'une des plus belles voix à Sherbrooke; il fut durant de nombreuses années membre de la chorale de la cathédrale St-Michel et de plusieurs autres sociétés artistiques.

Le Dr Gadbois ne s'était jamais occupé activement de politique fédérale ou provinciale; cependant, l'un des premiers résidants du Petit-Lac-Magog, il fut l'un de ceux qui firent des démarches pour la municipalisation de cet endroit de villégiature et fut conseiller et maire de cette municipaltié à plusieurs reprises.

Lui survivent, son épouse, un fils et deux filles.

Dr. J. Chester Houston, died suddenly at Charlottetown, P.E.I., on November 16, 1946, in his 73rd year. Born in this Province, educated at the public schools and Prince of Wales College, Dr. Houston graduated in Medicine at McGill University in 1898. He occupied various offices in the Island's Medical Society, and was a past president and treasurer of the Medical Council.

He practiced in New Glasgow, P.E.I., until 1900, and subsequently in Souris, Crapaud, and Kensington, until 1917, when he joined the Canadian Army Medical Corps and was medical officer of Western sub command until December 31, 1918.

From 1918 until 1920 re was medical officer in charge of electrical treatment department in Rena MacLean Hospital, Charlottetown, P.E.I. After cessation of this position he took a postgraduate course in Eye, Ear, Nose and Throat, and opened an office for the practice of this specialty in Charlottetown in 1921, continuing this practice until February, 1925, when he was appointed to the P.E.I. Hospital as anæsthetist, radiologist, and pathologist.

Dr. Houston received his Fellowship of International College of Anæsthetists in the '30's, being a charter member of this body. For the past three years he limited his activities to anæsthetics, continuing as anæsthetist at the P.E.I. Hospital till the time of his death. He had taken great interest in medical advancement, was a wide reader, and chairman of the Society's educational committee for a number of years.

A fine gentleman, of such genial and friendly disposition as to make him a general favourite, Dr. Houston will be mourned by his associates, a wide circle of friends, and most of all by his widow and one son, Dr. Gilbert Houston.

Dr. David Ogden Roebuck Jones died April 1 at his home in Toronto, in his 86th year.

Dr. Jones was born in Toronto. He attended Trinity College School, Port Hope, where he won the bronze medal in 1879, and was a graduate of the School of Medicine, Trinity College, Toronto. Dr. Jones took postgraduate work in London, England, and received the degree of L.R.C.P. in 1886. A veteran of the Northwest Rebellion, Dr. Jones served as medical officer. In his youth he was a keen cricketer and an ardent fisherman.

He is survived by his widow, two daughters and two sons.

Dr Joseph-Pierre Laporte, est décédé le 18 mars, à l'âge de 73 ans après une longue maladie.

Il avait fait ses études au séminaire de Joliette et fut reçu médecin en 1903. Depuis au delà de 40 ans, le docteur Laporte exerçait sa profession à Joliette et fut toujours attaché à l'hôpital St-Eusébe.

Echevin de la Cité de 1911 à 1918 et membre de plusieurs societés, il s'est toujours intéresse à l'avancement de ses concitoyens, y allant même souvent de ses propres deniers. Plusieurs années durant, il fut président du bureau des médecins de l'hôpital St-Eusèbe et fut longtemps gouverneur du Collège des Médecins.

Lui survivent, son épouse, deux fils et une fille.

Dr. Neil Murray McArthur died February 23, at Royal Naval Hospital, Haslar, Gosport, England.

Born in 1908, he was a graduate in medicine of the University of Western Ontario.

Dr. James Ross Macdonald, native of Wingham, N.S., died in London, February 27.

Well known in Wingham district, Dr. Macdonald was a physician in the town for about 30 years. He also attended public and high schools there.

He left Wingham to take up residence in London about four years ago.

Surviving are three sisters.

Dr. Malcolm Hugh MacKay died at St. Martha's Hospital, Antigonish, N.S., on March 26. He was born at Lake Ainslie in 1870 and after attending school at Sydney Academy, was engaged in teaching. He graduated in medicine from Queen's University in 1899 and in the same year settled at West Bay where he practised continuously until his last illness.

Dr. John A. McKenty, 64, well-known Winnipeg physician, died there March 10.

Major William Taylor McLean, M.D., E.D., aged 61, died March 7 at Christie Street Hospital, in Toronto.

Born in Lucknow, Ont., Major McLean received his education in Toronto. Graduating in medicine from the University of Toronto in 1910, he established a private practice. Enlisting in the First Great War, Major McLean served in Canada with the R.C.A.M.C. Following the war he resumed his Toronto practice. In 1939 he again enlisted for service in the R.C.A.M.C., continuing throughout the Second Great War. Major McLean was a member of St. Paul's Anglican Church.

Dr. Samuel C. W. Morris died suddenly on March 28, in Calgary, at the age of 68 years. He was born in Wallace, Cumberland County, Nova Scotia, where he practised for several years after his graduation from McGill University in 1902. Following a postgraduate course in New York he came to Calgary in 1912, where he practised until he enlisted in the First Great War. He saw service in Salonika where, following a severe attack of typhoid fever, he was evacuated and later discharged from the Canadian Army Medical Corps. On his return to Alberta he became associated with a coal mining company at Brule, Alberta, as contract doctor which position he held for fifteen years. After taking an extensive course in physiotherapy he returned to Calgary, where he continued in this special work until 1943, when he received injuries in a motor car accident, which necessitated retirement from practice. He was very highly esteemed by his confrères in this city. He is survived by his wife and one son. His other son, who was in the R.C.A.F., was killed during the battle of Dunkerque.

Le Dr J. A. Paradis, de S.-Henri de Lévis, a succombé récemment à une crise cardiaque à l'âge de 65 ans. Il était un médecin de grande érudition.

Il laisse son épouse, et sa fille.

Dr. Philippe Quesnel, Lac La Biche, died on March 27, aged 68. Dr. Quesnel was a graduate of Laval University, and came to Alberta in 1906, practising in the Morinville district. He served overseas in the First World War and following his return to Canada, practised in Edmonton, moving to Lac La Biche as Government Health Inspector, ten years ago.

He is survived by his wife and one daughter.

Le Dr Joseph-Edouard Riopelle, est décédé le 25 février à Montréal, à l'âge de 46 ans.

Né à Greenville, Maine, il avait fait ses études classiques au collège de L'Assomption et à l'université de Montréal. Il était attaché à l'hôpital S.-Jean de Dieu, et avait été durant plusieurs années médecin des Sœurs de Ste-Anne.

Il laisse, outre son épouse, un frère.

Dr. Donald Wilfred Stewart, aged 49, former member of the Royal Canadian Army Medical Corps who served aboard the hospital ship Lady Nelson on many Atlantic and Mediterranean crossings in the second World War, died March 12 in Christie Street Hospital, Toronto, after a short illness.

Born in Teeswater in 1897 he attended public and high school there. In 1915 he enlisted in the infantry and served overseas in the 160th Battalion and later in the Royal Flying Corps. He was graduated from the medical school of the University of Toronto in 1924 and from 1925 to 1936 practised in Shelburne. From 1937 to 1941, when he joined the medical corps, he practised in Hamilton.

Dr. Stewart was a past president of the Hamilton Lions club and was a member of the Masonic order.

Surviving are his widow, two sons, a daughter and a brother.

Captain William N. Winkler, aged 51, physician and lawyer in the R.C.A.M.C., was killed on March 22, when he walked into the side of a street car.

Captain Winkler graduated in medicine from University of Toronto in 1915, studied law later at Osgoode Hall, he was a medical officer in the army since August, 1942, and was anticipating an early discharge. He is survived by his widow and three daughters.

NEWS ITEMS

Alberta

The annual meeting of the Council of the College of Physicians and Surgeons was held in Edmonton on January 30, 1947. Dr. M. A. R. Young was elected president for the year 1947, and Dr. T. C. Michie, vice-president. Other members of the Council are: Drs. W. G. Anderson, S. M. Rose, J. D. Neville, J. W. Richardson, T. H. Field.

A questionnaire concerning voluntary pre-paid medical services was sent to the profession in the Province: 46.9% of the profession replied; 79.6% are in favour of the principle of pre-paid medical care; 18.8% voted "no" and 1.6% of the replies received were not scored; 56.4% of the profession indicated preference for administrative control by the division. The Economics Committee is studying the possibility and it is expected that a full report will be made to the profession in the near future.

The Alberta legislature has approved the expenditure of a sum of money to provide free hospitalization and medical services for old age pensioners, blind pensioners, recipients of mother's allowance, and certain other individuals receiving pensions from the Department of Public Welfare. Complete details have not yet been worked out in respect of the management of the scheme. It is expected that it will be operated in a manner somewhat similar to that which has been in force in the Province of Saskatchewan for the last two years.

The refresher course for 1947 will be held at the University of Alberta from May 12 to 16. The number of replies to the questionnaire sent to all practitioners would indicate that there will be a large attendance. The following visiting speakers will attend: Dr. F. R. Schemm, Great Falls, Montana; Dr. Roscoe R. Graham, Toronto, Ont.; Dr. Edwin Robertson, Professor of Obstetrics and Gynæcology, of Queen's University.

G. E. LEARMONTH

British Columbia

Dr. H. H. Pitts, Director of the Pathology Laboratory at Vancouver General Hospital has resigned his position at that hospital and has joined the staff of St. Paul's Hospital in Vancouver, as head of the Pathological Department.

Dr. W. Stuart Stanbury, Drector of the National Blood Transfusion Service of the Canadian Red Cross, recently addressed the Vancouver Medical Association on the subject of the Rh factor in relation to blood transfusions. This service of the Red Cross is proving a great boon to the hospitals of British Columbia, and donors are evidently available in adequate quantity as the collecting stations seem to be crowded.

The annual Osler lecture of the Vancouver Medical Association was given on March 4, at the Hotel Vancouver, by Dr. B. J. Harrison, Director of the X-ray Laboratory at Vancouver General Hospital. The attendance was very large, many having to be turned away and Dr. Harrison's paper was heard with intense interest. It will be published in the "*Bulletin*" in the Osler number. At this dinner the degree of "Prince of Good Fellows" was conferred upon Dr. Anson C. Frost. This choice was extremely popular with all his colleagues.

The British Columbia Medical Association has instituted a Benevolent Fund to apply to the whole Province. It will be used in cases of need or emergency among medical men and their families. A donation by the British Columbia Medical Council forms the nucleus of the fund, and the annual fees of every member will include an amount ear-marked for this purpose.

The prospects of a Medical School for British Columbia in the immediate future have faded almost to extinction with the decision of the Board of Governors of the University of British Columbia that funds now available are inadequate, at least for the present.

The Executive Meeting of the American College of Surgeons will be held in Vancouver, April 21 and 22, at the Hotel Vancouver.

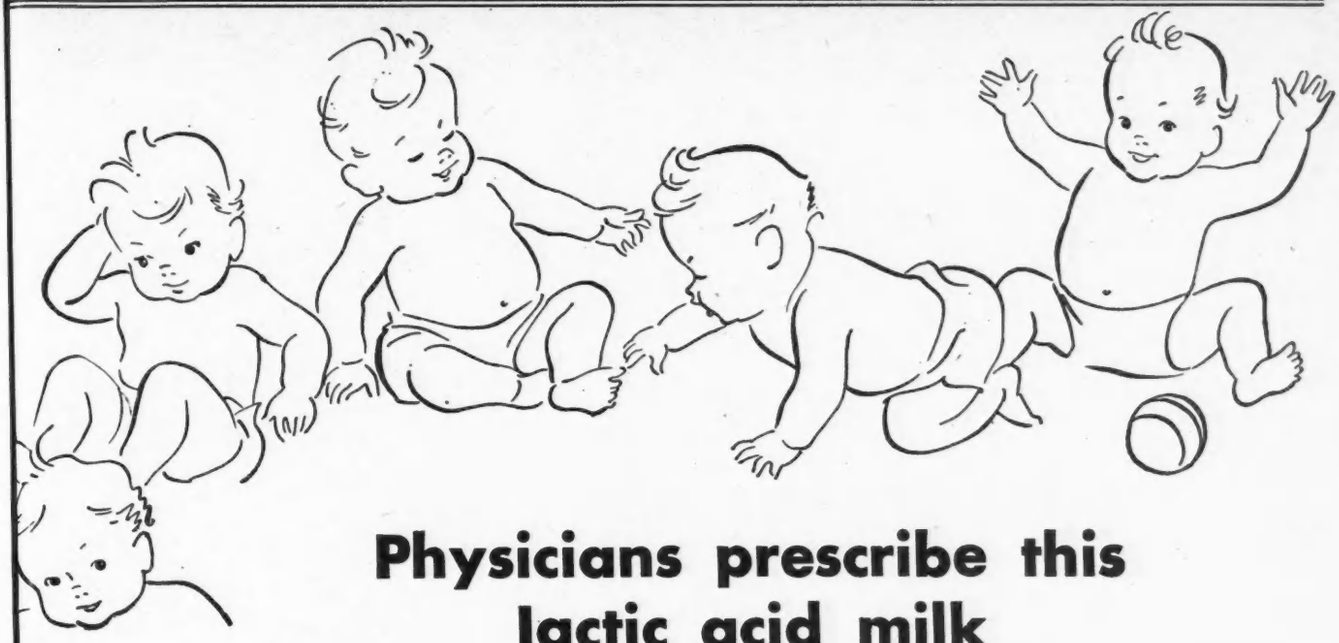
J. H. MACDERMOT

Manitoba

The Manitoba legislature has authorized an expenditure of $100,000, to provide for increased teaching facilities at the Medical College and for a blood transfusion laboratory. This amount is in addition to $30,000 already authorized to pay for more lecturers and instructors.

Dr. P. H. Thorlakson, professor of surgery, University of Manitoba, attended the meeting of the American Surgical Association at Hot Springs, Virginia.

Drs. Carl Henneberg and Archie G. Gray have left to pursue postgraduate studies in Great Britain.



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DETAILED LITERATURE AVAILABLE TO DOCTORS UPON REQUEST

Dr. Ben H. Lyons, internist, has opened an office in the Boyd Building, Winnipeg.

The Board of Governors of Manitoba University has announced that admissions to the Medical College will be increased to 90 at the next term beginning in September. Up to last year the annual admissions had been 60; last year the number was raised to 70.

A committee of doctors has been set up by the Medical Advisory Committee of the Sanatorium Board to act as a consulting board in regard to the use of streptomycin in tuberculosis.

The City of Winnipeg will apply to the provincial legislature for authority to spend $260,000 on top of the $650,000 already voted by the citizens for the construction of a hospital for the city's aged infirm. Such a hospital has been strongly urged by the Medical health officer, Dr. Morley Lougheed.

The attorney general of Manitoba has recommended to the legislature that domestic cases requiring the intervention of the law be dealt with in a special court in Greater Winnipeg to be called the Juvenile and Family Court.

The Associated Canadian Travellers sponsored a concert on March 29 in the Winnipeg Auditorium to raise money for a $26,000 mobile unit for the Manitoba Sanatorium Board. Donna Grescoe, Winnipeg violinist, was the guest artist at this concert.

Dr. W. Grant Beaton has been appointed Chairman of Manitoba Medical Service, Dr. C. W. Clark, secretary, and Dr. Digby Wheeler, treasurer. Manitoba Medical Service has decided that Manitoba Hospital Service Association will no longer act as administrating and selling agent, and will seek separate quarters.

There is an extreme scarcity of maternity beds in Greater Winnipeg. Though the Winnipeg General Hospital is planning to make a small increase in the near future the scarcity can be expected to continue for several months. Only the excavation and the piers for the foundation of the new maternity pavilion have been provided, but as yet tenders have not been called for the building.

ROSS MITCHELL

New Brunswick

Dr. J. A. Melanson, Chief Medical Officer of the N.B. Department of Health will sail from New York, March 22 for Europe where he will act as technical adviser to the commission set up to form a world health organization. Dr. Melanson is one of three Canadian physicians to appear at this meeting of the commission.

Dr. J. A. Hynes, Radiologist at the Victoria General Hospital, Fredericton, was the guest speaker at the February meeting of the Saint John Medical Society. Dr. Hynes spoke on the "Uses of Artificial Radiation with Especial Reference to Atomic Energy". His paper was the result of careful reading and preparation of a scientific résumé of much of the immediate current literature of this fascinating subject of present and future interest to all of us whether laymen or physicians. The large interested audience expressed their appreciation of the presentation of this paper on such a difficult technical subject by one of our own society members from the university town of Fredericton.

The N.B. Department of Health is pushing vigorously the chest survey of the Province now that the travelling diagnostic clinic has received their new x-ray equipment. At present Dr. Arthur Chaisson is completing the x-ray check up at McAdam. An effort is being made to have all admissions to general hospitals x-rayed as a method of covering a large section of the population quickly. This would be a considerable extra load on the already fully taxed services of our hospital x-ray departments.

The radiologists of New Brunswick met in Saint John late in February under their chairman Dr. J. A. Hynes of Fredericton. The reports from the meeting of the Canadian Association of Radiologists were considered and an invitation to the radiologists of Nova Scotia and P.E.I. to a joint meeting of Maritime x-ray men at Moncton was authorized.

Hon. F. A. McGrand, Minister of Health in New Brunswick was the special speaker at the Annual St. Patrick's day dinner in Saint John. Dr. R. T. Hayes, President of St. Patrick's Society was toast master.

Dr. W. A. Farrell of Toronto has been appointed resident radiologist to the D.V.A. Hospital at Lancaster.

The Provincial secretary-treasurer of New Brunswick included in his budget at the present session of the Provincial legislation funds for the establishment of cancer diagnostic clinics at selected hospitals in the Province. These clinics will be given the responsibility of providing diagnosis, hospitalization and transportation for cancer cases. The matter of the treatment of cancer has had the sympathetic attention of the cabinet for some time backed by the enthusiastic support of the Department of Health.

Dr. R. D. Roach of Moncton spoke on the subject of "The Refractory Anæmias" at the monthly meeting of the Saint John Medical Society. A good attendance of members and guests enjoyed Dr. Roach's methods of treatment in this interesting group of special problems.

The Commissioners of the Saint John General Hospital have made a further purchase of radium element to reinforce the equipment of the cancer clinic. The money for this latest purchase has been provided by the Dr. W. F. Roberts Chapter of the I.O.D.E. as a memorial to the first Minister of Health of the Province, The Hon. W. F. Roberts, M.D., whose interest in all public health matters will long be remembered in this country.

For some time the regulations of the N.B. Workmen's Compensation Board have provided "That no fees for medical aid should be payable or recoverable unless application for such payment be made in writing to the board within three months". At the present session of the legislature the prohibitory feature regarding the Board was removed but still insists that application by the physician shall be made within 90 days after completion of services.

Dr. C. L. Emerson has been elected President of the Medical Board of the Saint John General Hospital.

A. S. KIRKLAND

Ontario

Dr. A. D. Kelly, Assistant Secretary of the Canadian Medical Association, recently spoke to the Lawyers Club of Toronto on Health Insurance. He expressed the official viewpoint of the Canadian Medical Association. This is the first time in this Club's existence when it has been addressed by a layman. The lawyers were interested in health insurance as a timely social problem of public concern. They wondered if a similar plan would some day include legal aid.

The Women's Law Association of Ontario entertained members of the Medical Alumni of the University of Toronto and women medical graduates of other universities practising in Toronto, at the home of Mrs. Ward Wright, on the evening of March 19. Dr. Jean Davey gave a biographical sketch of some of the pioneer women physicians, and Elizabeth Newton, K.C., told the life story of Clara Brett Martin of Toronto, the first woman

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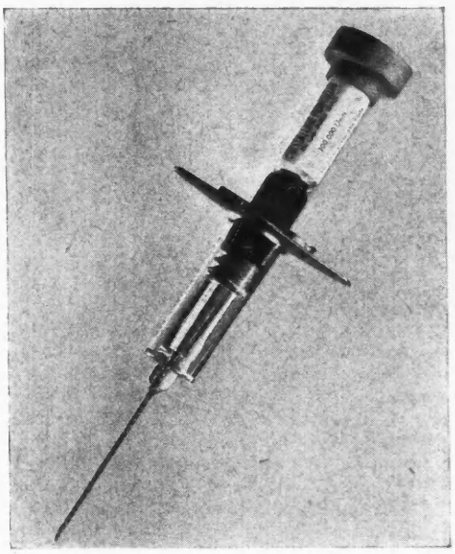

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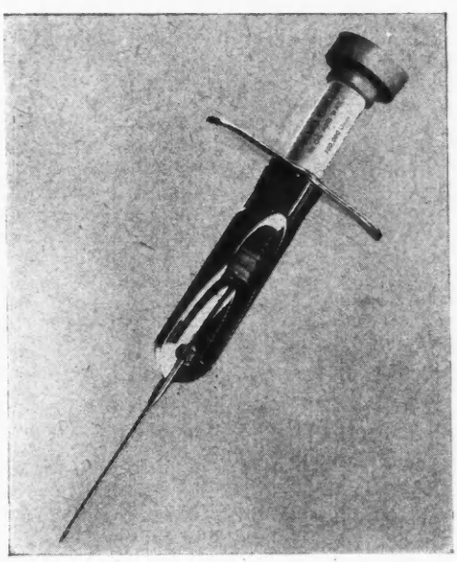

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CONNAUGHT MEDICAL RESEARCH LABORATORIES

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called to the Bar in the British Empire. In 1891 she applied the Benchers of the Law Society of Upper Canada for admission as a Student-at-Law. In 1897, after six years of struggle, she was called to the Bar in the Hiliary term. She practised at first with Messrs. Shilton and Wallbridge but in 1905 set up by herself and practised until her death in 1923.

After listening to these two informative addresses, about eighty physicians and barristers then enjoyed a social hour over coffee.

Dr. John A. Ryle, Professor of Social Medicine at Oxford University, spoke on "Social Medicine and the Related Science of Social Pathology" at Convocation Hall during his four-day visit to Toronto in March.

Professor Ryle was brought to the North American Continent by the Rockefeller Foundation to discuss and explore the field of social medicine. In his several addresses to medical and lay audiences, he described the efforts of his department to correlate studies of disease from the clinical viewpoint with the study of social conditions. He mentioned current studies of peptic ulcers, coronary disease, and tuberculosis, together with the study of the development of normal babies.

He was accompanied by his wife who epitomizes the newly awakened interest of British women in modern housing and housekeeping methods. The Ryles delighted those who met them in Toronto because of their friendly interest in Canada, their description of town and country life in wartime Britain, and stories of their five children who are pursuing interesting careers in medical and scientific research.

A symposium on "Ulcerative Colitis" was held at the March meeting of the Staff of the Women's College Hospital, Toronto. Dr. Jean Davey discussed its medical aspects. She said that very often the serum proteins were depleted and that the hæmoglobin was lowered. She advocated the use of ten times the normal requirements of vitamins, full doses of iron, and a diet containing from 130 to 150 grams of protein.

Dr. Jessie Gray discussed its surgical aspects with presentation of a case who had diarrhœa for nine years before seeking medical aid. After two months of medical treatment a bowel resection had been done. The patient gained in weight and was finding her colostomy less care than her former diarrhœa.

Dr. Elizabeth Stewart showed x-ray pictures of the rope-like contracted colon typical of this condition.

Dr. Ricky Kanee Schacter of Toronto announces that she has resumed her practice after the birth of her son on December 26, 1946. She limits her practice to Dermatology and Syphilology.

Dr. Ernest G. Meyer of Toronto announces the opening of an office for the practice of Urology. He graduated in 1938 from the University of Toronto. After taking the Gallie Course, he received his Master of Surgery in 1945 and his F.R.C.S.[C.] in 1946. He spent four years in the R.C.A.F.

The Mess Committee of the R.C.A.M.C. (RF) Officers' Mess, Toronto Garrison, has announced that the Mess will be open to Associate Members. It was a former large private residence at 204 St. George Street. The initial Associate Membership fee will give full Mess privilege, except of voting or holding office. The Mess is open Thursday evenings.

Dr. Joseph A. McClintock, after practising in Uxbridge since 1902, has decided to pass his practice over to his son, Dr. William McClintock. Dr. McClintock, Sr., is a veteran of the Boer War and is still well in spite of his seventy-three years.

The Medical Alumnæ Association of the University of Toronto held their annual banquet in honour of the 15 women of the graduating class in Medicine on March 29 at the King Edward Hotel. Professor William Boyd was the guest speaker.

Dr. C. H. Best received the degree of Doctor of Medicine, *Honoris Causa*, from the University of Amsterdam at a session of the Senate of the University held on January 8, 1947. The degree was received by the Canadian Minister of Holland, Mr. Pierre Dupuy, on behalf of Dr. Best. Professor S. van Creveld addressed the Senate on this occasion.

Dr. Best was also made an Honorary Member of the Royal Academy of Sciences, Amsterdam.

Dr. Douglas Taylor addressed the North Bay and District Medical Society, March 19, on "Arthritis", and the Muskoka Medical Society at Gravenhurst on March 21, on the same topic. LILLIAN A. CHASE

The Medical Alumni Lectureship in the Faculty of Medicine, University of Western Ontario was inaugurated three years ago for the benefit of the medical profession in Western Ontario. The fifth semi-annual session was held April 1, 2, and 3 with Dr. Fraser B. Gurd of Montreal as guest lecturer. Dr. Gurd gave three lectures. His subjects were: "Thirty Years of Thoracic Surgery"; "The Pathology and Treatment of Burns"; and "Mechanism in the Production of Fractures". He also conducted a clinical conference in one of the hospitals. Members of the faculty contributed an extensive program of lectures and demonstrations. The Alumni deserve congratulations on their enterprise and the success in their latest effort in postgraduate education.

Dr. Juliet Chisholm has recently returned from China where she had worked with UNRRA. Previously Dr. Chisholm has served in the R.C.A.M.C. after a three year internship in the Hospital for Sick Children, Toronto. She has opened an office in Oakville and will limit her practice to Pædiatrics.

Dr. Lloyd E. Hamlin who is a graduate of the University of Toronto (1922 Medicine) addressed the members of the Section of Industrial Medicine, Academy of Medicine, Toronto, on the evening of March 21. The subject of his address was "Siderosis and Allied Chest Diseases as Seen in Industry". A dinner was given in honour of Dr. Hamlin at the York Club previous to the meeting.

Dr. Hamlin has brought fame to his alma mater in the world of Industrial Medicine. He is a recognized authority on chest diseases and he is the medical director of the American Brake Shoe Company. This vast organization has fifty-six large industrial plants throughout the United States and Canada.

The Porcupine District Medical Society are holding a symposium at St. Mary's Hospital, Timmins, Ont., an Saturday, May 3 at 2.30 p.m. The speakers of the symposium will include Dr. D. J. Galbraith, vice-chairman, Workmen's Compensation Board; Dr. E. C. Steele, chief medical officer; Mr. Campbell, the rehabilitation officer; and Mr. G. C. Camperon, the medical aid officer, who will speak on doctors' accounts.

The purpose of the symposium is to bring to the attention of the doctors the prevention of long convalescence in the treatment of injury and the proper treatment during the convalescence. After the symposium a dinner will be held, the place to be announced later. Doctors' wives are cordially invited to the dinner.

Following the dinner a committee of doctors' wives composed of Mrs. Dr. G. C. Armitage, Mrs. Dr. J. E. Barry, Mrs. Dr. C. M. Boutin, Mrs. Dr. J. E. Lewis, will present a musical program.

Doctors from Temagami north to Hearst and any other doctors visiting in the community are cordially invited.

Quebec

A research fellowship in Medicine has been awarded by the American College of Physicians, for the year beginning July 1, 1947, to Dr. A. L. Johnson, of Montreal. Dr. Johnson will continue his investigation of the hæmodynamics of congenital heart disease in the Children's Memorial Hospital and the Department of Physiology, McGill University, under the direction of Dr. Alton Goldbloom and Professor H. E. Hoff. Dr. Johnson received the B.A. degree from McGill University in 1935, and his medical degree in 1940. His internship was taken at the Montreal General Hospital in 1941. Dr. Johnson subsequently served as medical officer in the Royal Canadian Navy Medical Corps.

Announcement has been made of the appointment of Dr. Frederick Smith as Associate Dean of the Faculty of Medicine of McGill University.

Dr. Smith is professor of bacteriology of McGill University. A graduate of Cambridge, he holds the M.R.C.S. and L.R.C.P.(Lond.). He joined the McGill teaching staff in 1931, as lecturer, and rose to his professorship in 1946.

The Centenary of the College of Physicians and Surgeons of the Province of Quebec.—The College of Physicians and Surgeons of the Province of Quebec will celebrate its 100th anniversary in the month of September next. A two-day meeting will be held in Montreal to pay tribute to the work of those who founded the organization in 1847. The intervening period has seen almost indescribable changes in medicine. When the College was founded, nothing was known of infection of endocrine glands, of calories, of vitamins, of x-ray. It is therefore very interesting to compare the small booklet which contains the original statutes, rules and regulations of the College. The subjects laid down for study were: anatomy and physiology, practical anatomy, surgery, theory and practice of medicine, obstetrics and diseases of women and children, chemistry, materia medica and pharmacy, institutes of medicine, medical jurisprudence and botany.

An elaborate program has been prepared in fitting recognition of this occasion. Large numbers of medical men from all parts of the Province are expected, and a special souvenir booklet containing a short history of the College by Dr. Albert Lesage is being prepared. The President and Governors of the College, and the organizing committees extend a warm welcome to all members of the profession in our Province to be present at these notable celebrations.

The days of meeting will be September 10 and 11, and the headquarters will be the Windsor Hotel. Reservations of rooms should be made early.

Le Collège des Médecins et Chirurgiens de la province fêtera, les 10 et 11 septembre 1947, le centenaire de son incorporation.

Les Journées Médicales de la Société Médicale de Montréal auront lieu à l'Hôtel Windsor les 5, 6, 7, et 8 mai 1947.

Les médecins dont les noms suivent ont été nommés, dans leurs hôpitaux respectifs de la région de Montréal, assistants réguliers à titre hospitalier: Drs Guy Bégin, Paul Brodeur, Léon Longtin, Fernand Grégoire, J.-C. Doucet et Roland Décarie.

Les Drs Edmond Dubé et Urgel Gariépy ont été nommés membres associés étrangers de l'académie de chirurgie de Paris.

Le prochain congrès de l'Association des Médecins de Langue Française du Canada se tiendra à Ottawa les 6, 7, 8 et 9 septembre 1948. Les thèmes généraux du congrès seront le cancer et les affections cardio-vasculaires.

JEAN SAUCIER

Le Dr J. L. Petitclerc, F.R.C.S.[C.], professeur titulaire de clinique chirurgicale et chef du service "B" de chirurgie à l'Hôtel-Dieu, est allé représenter la Faculté de Médecine au centenaire de la fondation de la Société de Chirurgie de Paris. Il fut, à cette occasion, en témoignage d'estime personnelle et en considération du travail accompli par le groupe canadien-français, nommé membre de l'Académie de Chirurgie de Paris.

Le Département d'Acclimatation, que dirige le Dr Louis-Paul Duval, à l'Institut d'Hygiène et de Biologie humaine, vient de recevoir trois octrois différents pour les travaux en cours: $2,000.00 de la Compagnie Ciba pour recherches sur le diabète; $1,500.00 de la Maison Hoffmann-LaRoche pour expériences sur le Shock dû aux brûlures; et $500.00 de la Shawinigan Chemicals pour faciliter les travaux de documentations bibliographiques.

Il nous est très agréable de mentionner la récente nomination du docteur François Roy à l'Académie de Chirurgie de Paris. Notre professeur de médecine opératoire a reçu, du professeur Jacques Leveuf, secrétaire général de l'Académie de Médecine, une lettre lui annonçant que cet honneur qui lui avait été décerné à la séance du 18 décembre dernier. Chef de Clinique chirurgicale à l'Hôtel-Dieu dans le service du doyen, Charles Vézina, il est aussi membre de l'Association des Chirurgiens du Canada et tout récemment il a été fait membre "fellow" de l'American College of Surgeons.

Au récent congrès des Chirurgiens américains tenu à Cleveland, notre professeur titulaire de Médecine opératoire, le Dr François Roy, chef de Clinique chirurgicale à l'Hôtel-Dieu, a été admis au rang des membres de l'American College of Surgeons, sous le titre de "Fellow".

En remplacement de monsieur le docteur Saluste Roy, décédé, le Dr Lucien LaRue, F.R.C.P.[C.], professeur titulaire de psychiâtrie et chef de service à l'Hôpital St-Michel-Archange, vient d'être nommé surintendant médical de St-Michel.

Le Conseil universitaire acceptait, à sa séance du 10 mai 1946, de prendre charge de l'Hôpital des vétérans que lui offrait le Ministère des Affaires des Anciens Combattants: la Faculté de médecine y organise l'enseignement et les nominations du personnel médical relèvent de l'université.

Il s'agit d'une institution de trois cents lits, située dans les édifices occupés autrefois par l'Hôpital de la Marine, où se sont illustrés les grands médecins du siècle dernier, les Douglas, Frémont, Painchaud, Iffland, etc., puis successivement par l'Hospice St-Charles, l'aviation et l'Hôpital Militaire. On y trouve tous les services d'un hôpital général dont les plus importantes fonctions sont les deux suivantes: chaque malade étant l'objet d'un rapport complet qui sert à établir l'incapacité physique, les services de consultation interne et externe fonctionnent à un haut rendement; la thérapie occupationelle et la physiothérapie exigent deux départements extrêmement développés.

La bibliothéque est double: l'une pour les malades et l'autre pour les médecins où sont réunis les volumes et les périodiques les plus modernes, tant en français qu'en anglais. Il existe même un bulletin mensuel (Treatment Bulletin) publié à Ottawa et mis à la disposition de tous les hôpitaux du D.V.A. au Canada: non seulement les médecins sont invités à y publier leurs observations intéressantes, mais on les encourage même à poursuivre des recherches de médecine expérimentale. Autour des grands services de médecine et de chirurgie, gravitent toute une série de départements connexes: oto-rhino-laryngologie, ophtalmologie, radiologie, physiothérapie, cardiologie, psychiâtrie, laboratoires de chimie, bactériologie et anatomo-pathologie, dermatologie, etc.

PIERRE JOBIN